CA2ALOG 10
67R67-A
C.1

CA2 ALOG 10 1967R67-A
Report on an Application of Alberta And
Southern Gas Co. Ltd. Under the Ga 2
3 3398 00302 1507

C1
DEC 29 1974
EDMONTON

LIBRARY
VAULT 19

OGCB REPORT 67-A

REPORT ON AN APPLICATION OF ALBERTA AND SOUTHERN GAS CO. LTD. UNDER THE GAS RESOURCES PRESERVATION ACT, 1956

JANUARY, 1967

Alta

OIL AND GAS CONSERVATION BOARD
603 SIXTH AVENUE SOUTH WEST • CALGARY, ALBERTA

Digitized by the Internet Archive
in 2022 with funding from
Legislative Assembly of Alberta - Alberta Legislature Library

REPORT ON AN APPLICATION OF ALBERTA AND SOUTHERN GAS CO. LTD. UNDER THE GAS RESOURCES PRESERVATION ACT, 1956

JANUARY, 1967

OIL AND GAS CONSERVATION BOARD
603 SIXTH AVENUE SOUTH WEST • CALGARY, ALBERTA

Price $1.00

TABLE OF CONTENTS

Section		Page
I	INTRODUCTION..............................	1
	Amendment considered by Direction of the Board	2
	Date of Reserve Assessment and Period of Protection	2
II	INTERVENERS..............................	3
III	SUBMISSION OF ALBERTA AND SOUTHERN GAS CO. LTD..............................	4
	Reserves of Gas	6
	Reserves under Contract in Certain Fields	7
	Deliverability	9
	Surplus	10
IV	SUBMISSIONS OF INTERVENERS................	12
	The Alberta Division of the Canadian Petroleum Association	12
	City of Edmonton	12
	Canadian Western Natural Gas Company Limited and Northwestern Utilities, Limited	13
	Atlantic Richfield Company and Sinclair Canada Oil Company	14
	Mobil Oil Canada, Ltd.	15
	Pan American Petroleum Corporation	15
V	BASIS OF CONSIDERATION..................	17
	Contractable Reserves	17
	Deliverable Volumes	18
	Gold Creek, Carson Creek and Carson Creek North Fields	19

Section Page

Extension of Term of Permit 21

Later removal of Volumes Authorized but not Removed 22

VI FINDINGS.............................. 25

1. In the Matter of the Established Reserves of Gas in Alberta 25

2. In the Matter of the Trends in Exploration and the Growth of Reserves of Gas in Alberta 25

3. In the Matter of the Present and Future Requirements of Alberta for Gas and the Present Permit Commitments 27

4. In the Matter of the Meeting of the Thirty-year Requirements of Alberta and the Present Permit Commitments, and the Resulting Surplus 27

5. In the Matter of the Volumes under Contract and the Permit Volume Applied for by Alberta and Southern Gas Co. Ltd. 29

6. In the Matter of the Applicant's Application for Authorization for the Removal of Additional Quantities of Gas and the Surplus which would Result if the Application were Granted 29

7. In the Matter of other Amendments Applied for by Alberta and Southern Gas Co. Ltd. 31

8. In the Matter of the Deletion from and Addition to the Permit of Certain Fields 32

9. In the Matter of the Disposition of the Application of Alberta and Southern Gas Co. Ltd. 33

Section Page

APPENDIX A A-1

The Established Reserves of Gas in Alberta

APPENDIX B B-1

The Trends in Exploration for and the Growth of Reserves of Gas in Alberta

APPENDIX C C-1

Alberta Gas Requirements and Present Permit Commitments

APPENDIX D D-1

The Meeting of Alberta's Requirements for Gas and the Present Permit Commitments, and the Resulting Surplus

APPENDIX E E-1

The Applicant's Application for Authorization for the Removal of Additional Quantities of Gas and the Surplus which would Result if the Application were Granted

APPENDIX F F-1

Form of Amendment of Permit

LIST OF TABLES

Table Page

A-1 Established Reserves of Gas in the Province of Alberta, June 30, 1966........ A-6

C-1 Summary of Forecasts of Alberta Gas Requirements for Period January 1, 1966, to December 31, 1995....................... C-4

C-2 Permit Commitments.......................... C-5

D-1 Reserves and Reserve-delivery Ratios of Fields now Supplying Alberta's Requirements for Gas................................. D-11

D-2 Summary of Reserves and Average Reserve-delivery Ratio for all Reserves in the Province.................................. D-15

D-3 Marketable Reserves and Reserve-delivery Raiots available in the Fields included in Permits................................ D-16

D-4 Reserves Required to meet Present Permit Commitments.............................. D-22

D-5 Gas Surplus to Alberta's Requirements and Permit Commitments as of June 30, 1966 as estimated by the Board................. D-23

D-6 Deferred Gas Reserves....................... D-24

E-1 Marketable Reserves in Fields Applied for by Alberta and Southern Gas Co. Ltd........ E-6

E-2 Reserves Required to meet Present Permit Commitments including Alberta and Southern Application.............................. E-7

E-3 Gas Surplus to Alberta's Requirements and Permit Commitments as of June 30, 1966 if Alberta and Southern Application is Granted.................................. E-8

LIST OF FIGURES

Figure

A-1 Gas Fields and Areas of Alberta A-30

I INTRODUCTION

The subject application made by Alberta and Southern Gas Co. Ltd. (hereinafter called "Alberta and Southern") under The Gas Resources Preservation Act, 1956, was heard by the Board on October 4 and 5, 1966. Mr. R. A. MacKimmie, Q.C. appeared for the applicant.

Alberta and Southern is the holder of Permit No. AS 64-3 by which it is authorized to remove from the Province gas produced from certain fields and pools named in the Permit. It has made arrangements to purchase gas from additional sources and proposes to remove such gas from the Province. The application asked that Permit No. AS 64-3 be amended by extending the term of the permit by four years, by the addition of eight fields to, and the deletion of one field from, the list of fields and pools from which gas may be taken for removal from the Province and by increasing the daily, annual and total maximum volumes of gas that may be removed. The application proposed also that, in amending the maximum volumes condition, the amount of cumulative production upon which a limitation therein based on field productivity and good engineering practice would become applicable be appropriately amended, that the annual maximum volumes apply to a year ending October 31 instead of a rolling twelve-month period, and that it be provided that an annual maximum volume may be augmented by a quantity of gas by which removals in an earlier year had been less than the authorized volume for the earlier year.

Amendment Considered by Direction of the Board

At the time the application was filed with the Board, the list of fields and pools in Permit No. AS 64-3 included some from which gas had not been taken and for which Alberta and Southern did not have gas purchase contracts of which the Board was aware. These were the Berland River Field, the Burnt Timber Field, the Carson Creek Field, the Carson Creek North Field, the Fox Creek Field, the Fox Creek West Field, the Hunter Valley Field and the Wildhorse Creek Field. In the Notice of Hearing the Board indicated that it would consider amending the Permit by the deletion of these fields unless the Permittee satisfied it that such amendment should not be made.

Date of Reserve Assessment and Period of Protection

Alberta and Southern's estimate of gas reserves dealt with reserves as of June 30, 1966. In this report the Board presents reserve estimates as of the same date.

The period for which the Board has assessed the requirements of the Province and permit commitments is thirty years commencing July 1, 1966.

II INTERVENERS

The following registered at the hearing as interveners:

Interveners	Represented by	Abbreviation of Name Used in Report
City of Edmonton	A. F. Macdonald, Q.C.	City of Edmonton
Canadian Western Natural Gas Company Limited and Northwestern Utilities, Limited	B. V. Massie, Q.C.	Utility Companies
Alberta Division of the Canadian Petroleum Association	D. W. MacFarlane	Alberta Division of CPA
Atlantic Richfield Company and Sinclair Canada Oil Company	D. C. Hetland	Atlantic and Sinclair
Mobil Oil Canada, Ltd.	D. A. MacWilliam	Mobil Oil
Pan American Petroleum Corporation	G. E. Little	Pan American
Trans-Canada Pipe Lines Limited	F. P. Layton, Q.C.	Trans-Canada

Trans-Canada registered for the purposes of cross-examining witnesses and of advancing argument, but after registering did not contribute further to the proceedings.

The City of Lethbridge made no appearance at the hearing. It had, however, sent a letter to the Board in response to the Notice of Hearing in which it expressed the assumption that the Board, before granting the application, would make sure that the supply of gas to meet future gas requirements of the Province would not be impaired by granting the application.

III SUBMISSION OF ALBERTA AND SOUTHERN GAS CO. LTD.

Alberta and Southern applied to the Board for amendment of its Permit No. AS 64-3 to allow it to remove additional volumes of gas from the Province. Specifically, the applicant asked that

(1) the permit period be extended by four years from October 31, 1989, to October 31, 1993;

(2) the volume of gas it may remove in any day be increased by 275 million cubic feet to a volume of 1,025 million cubic feet;

(3) the volume of gas that may be removed in each year be increased by 86 billion cubic feet to 336 billion cubic feet;

(4) the annual maximum volumes apply to a year ending October 31 instead of a rolling twelve-month period;

(5) the limitation on daily and annual volumes based on field productivity and good engineering practice be either eliminated or appropriately amended to allow greater cumulative production before it becomes applicable;

(6) it be allowed to remove, in addition to the annual volume specified in the permit, any volume authorized, but not removed, during any preceding year, subject to the maximum day restriction in the permit;

(7) the quantity of gas that may be removed during the extended term of the permit be increased by 1,680 billion cubic feet to 8,130 billion cubic feet;

(8) the Westerose Field be deleted from the permit, and the Gold Creek Field, Waskahigan Field, Simonette Field, Kaybob South

Field, Pembina Pekisko Pool, Belloy Field, Eaglesham Field and Tangent Field be added to the list of fields from which gas may be removed.

Mr. Robert Blair, Vice-president (now President) and Manager of Alberta and Southern, as a witness for the applicant, elaborated on the form and substance of the application, and on the reasons why the applicant sought the amendments requested. He explained that the four-year permit extension is necessary because the new gas purchase contracts call for first delivery on or about November 1, 1968, and have a term of twenty-five contract years.

In discussing the proposed increase in the volumes of gas that may be removed, he said that the applicant preferred an amendment of the existing permit rather than a separate permit for the increased volumes. The amended permit would allow Alberta and Southern to retain the operating flexibility of removing gas under a single permit and provide each field with the opportunity of delivering as much gas as the field from time to time was able to produce.

Referring to the request that annual volumes authorized but not removed be removable in subsequent years, Mr. Blair contended that it is not practical to remove in each year a constant quantity of gas due to year to year variations in demand. He stated that the applicant would not exceed the daily maximum volume specified in the permit and that the amendment would permit Alberta and Southern to remove the full quantity of gas requested.

Mr. Blair asked that the Westerose Field be deleted from the permit because contracts for the gas have been obtained by others, and it is not available to the applicant.

Pacific Gas Transmission Company and Canadian-Montana Pipe Line Company have agreed to purchase the additional volumes of gas requested by the applicant. Copies of letter agreements for this purpose were incorporated in the application.

Additional pipe line facilities, consisting of extensions to the Foothills Division of The Alberta Gas Trunk Line Company Limited system, will be necessary to tie in all the new supply fields. The Alberta Gas Trunk Line Company, by a letter to the applicant which appears in the application, stated that it is prepared to construct, operate and maintain the facilities necessary to transport the additional volumes requested.

Reserves of Gas

The applicant did not present evidence as to the reserves of gas in the Province as a whole. It did, however, estimate that as of July 1, 1966, the initial marketable reserves of gas in the fields now in the permit, excluding the Burnt Timber, Fox Creek West and Westerose Fields, were some 7,415 billion cubic feet. Reserves in the fields it wishes added to the permit were estimated to be 950 billion cubic feet. Therefore, the applicant's estimate of the total marketable reserves available to meet the requested permit requirement of 8,130 billion cubic feet amounts to some 8,365 billion cubic feet.

Details of the applicant's estimates and the comparative estimates of the Board are presented in Appendix A.

Reserves under Contract in Certain Fields

In advertising the application for hearing, the Board asked Alberta and Southern to show cause why the Berland River Field, the Burnt Timber Field, the Carson Creek Field, the Carson Creek North Field, the Fox Creek Field, the Fox Creek West Field, the Hunter Valley Field and the Wildhorse Creek Field should not be deleted from the permit because gas was not being taken from these fields and because the gas in these fields did not appear to be under contract to the permittee.

Alberta and Southern presented evidence to show that it has under contract some 93 per cent of its estimate of the initial marketable reserves in all the fields now included in its permit. Furthermore, the applicant stated that, with the exception of the Westerose Field discussed previously, the Burnt Timber Field and the Fox Creek West Field in which it does not have contracts, it has negotiated gas purchase contracts for a significant portion of the reserves in each of the fields listed in its permit, including the fields listed in the show cause portion of the notice.

Mr. Blair stated that since the applicant does not have contracts in either the Burnt Timber or Fox Creek West Fields, he could see no good reason why the two fields should remain in the permit.

Mr. Blair agreed that gas is not now being taken from the remainder of the fields listed in the show cause portion of the notice of hearing, but he said that in the next three or so years gas from all of the fields, save for the two exceptions, would enter the pipe line system and be removed from the Province. In view of this, and because the gas is under contract, Mr. Blair asked the Board to leave all of the fields mentioned in the notice of hearing except the Burnt Timber and Fox Creek West Fields, in its permit.

With regard to the new supply fields, Alberta and Southern indicated, through its second witness, Mr. A. N. Boyse, Supervising Gas Supply Engineer for the applicant, that it has under contract some 84 per cent of its estimate of the reserves in the fields. The applicant does not, however, have contracts in the Simonette Field and in the Pembina Pekisko Pool it has only 37.5 per cent of its estimate of reserves under contract. In the remainder of the new fields, it has under contract a substantial portion of reserves in each field.

There was considerable discussion at the hearing about the desirability of leaving the Carson Creek and Carson Creek North Fields in the permit and of including the Gold Creek Field as a new supply source in any amended permit that the Board may issue. Although the reserves in each field are claimed by the applicant to be under contract to it, gas from the fields may not be available immediately due to cycling operations. The Carson Creek Field is now being cycled to prevent the loss of natural gas liquids with gas from Carson Creek North being injected into the Carson Creek Field to maintain pressure. The

Gold Creek Field has not been placed on production and the operators have not indicated their intention with respect to the manner of depletion of the reserves, but, the natural gas liquid content is such that cycling operations may be desirable.

Mr. Blair recognized that there may be fields such as the three mentioned that are under contract to the applicant and included in a permit but from which the gas may not be available to the applicant due to reservoir conditions or to the actions of a regulatory body. However, he contended that gas from such fields would be available to the applicant some time during the term of the permit, and should therefore be considered as a source of supply and be included in the permit.

Deliverability

The applicant submitted detailed deliverability schedules showing that of the 8,130 billion cubic feet it requested authority to remove, some 6,730 billion cubic feet could be delivered during the term of the extended permit from fields now in the permit and about 900 billion from the new supply fields. The schedule showed a deficiency of some 500 billion cubic feet in the latter years of the proposed extended term of the permit. In its estimate of deliverability, Alberta and Southern did not include reserves in the Burnt Timber, Fox Creek West and Westerose Fields.

Mr. Blair contended that the deliverability schedules are illustrative only, that the deficiency in supply is rather small when compared to the total volume requested and that in view of the many uncertainties in estimating deliverability over a long period, the Board should grant the full amount applied for. He argued that, based on the experience gained in the past, the entire amount applied for would likely be produced during the term of the permit.

Surplus

Alberta and Southern contended that a surplus of gas exists in Alberta sufficient to permit the removal of the additional 1,680 billion cubic feet it applied for. It did not present detailed calculations to substantiate the contention. Instead, the applicant relied on the Board's last analysis of the matter published in OGCB Report 66-C(1) and amended certain of the entries.

The applicant increased the Board's estimate of contractable reserves by some 1,500 billion cubic feet by transferring to this category reserves in certain fields considered by the Board to be beyond economic reach and by adding some reserves that were deferred for pressure maintenance purposes. Alberta and Southern indicated that gas from some of the fields considered by the Board to be beyond economic reach is now subject to sales contracts to the applicant. Also, the applicant argued that fields in which cycling operations are now being conducted should be considered contractable because gas from some of these fields is in fact under contract to the applicant and will be available for removal in the foreseeable future.

---

(1) Report on an Application of Trans-Canada Pipe Lines Limited under The Gas Resources Preservation Act, 1956. June, 1966.

Alberta and Southern contended that by adding the new contractable reserves (1,500 billion cubic feet) to the surplus of 1,100 billion cubic feet estimated by the Board in OGCB Report 66-C, a contractable surplus results which is more than adequate to satisfy the application for an increase of 1,680 billion cubic feet.

The applicant recognized that the remaining and future reserves must be reduced by the amount transferred to the contractable category (1,500 billion cubic feet). However, it contended that discoveries and appreciation of known fields since the Board's last analysis will prove adequate for the authorization of the increased quantities applied for.

IV SUBMISSIONS OF INTERVENERS

At the hearing of Alberta and Southern's application, the Board heard six interventions. Another intervener, Trans-Canada Pipe Lines Limited, appeared for the purpose of cross-examination only.

Following is a summary of each intervener's submission.

The Alberta Division of the Canadian Petroleum Association

The Alberta Division of CPA supported the application of Alberta and Southern. Although it had not made an estimate of the reserves of gas in Alberta since its 1965 year-end estimate, the Alberta Division could see no evidence to indicate any significant change in the reserves growth trend exhibited over the past several years.

The Alberta Division of CPA contended that approval of the application would provide a greater market opportunity, resulting in more vigorous exploration for and development of gas reserves. It was of the opinion that the application could be approved within the Board's present policy respecting the removal of gas from the Province.

City of Edmonton

The City of Edmonton did not oppose the application of Alberta and Southern. The purpose of the submission was to inform the Board of the City's concern with respect to an adequate long term supply for its residents and to urge the

Board to have regard for the consumers in the Province before approving the removal of gas from Alberta.

The City of Edmonton re-emphasized some of the points it presented before the Board in March, 1966, during the hearing of an application of Trans-Canada Pipe Lines Limited(1). In particular, the City contended that

(a) since it is the practice of the permittees to apply for increases in their permit volumes almost as soon as reserves appreciate or are discovered, these reserves never do become a part of the future requirements of the Province, (Dr. Flock, appearing for the City, suggested that the local Utility Companies be given every opportunity of contracting for such reserves.)

(b) because many future gas discoveries are likely to be some distance from the major provincial markets some consideration should be given to the use of the rapidly expanding Alberta Gas Trunk Line system for transporting gas to the major centres of the Province,

(c) in assessing the application, the Board should consider the effect of the new proration system on the availability of associated and solution gas.

Canadian Western Natural Gas Company Limited and Northwestern Utilities, Limited

The Utility Companies did not object to the applicant's request for authorization to remove additional volumes of gas.

---

(1) See OGCB Report 66-C. Report on an Application of Trans-Canada Pipe Lines Limited under The Gas Resources Preservation Act, 1956. June, 1966.

Mr. Maybin, testifying for the Utility Companies, suggested to the Board that any permit authorizing the removal of gas be limited to that amount that could be produced from the fields contained in the permit. Also, he expressed the belief that the Board should not include in a permit any field in which less than a substantial portion of the reserves are under contract to the applicant. The Utility Companies suggested that the Board allow the applicant to remove gas authorized but not removed in previous years. However, they contended that a "make-up period" of a limited number of years, say 2 or 3, would not only be more reasonable and practical to administer, but would correspond to the applicant's average make-up period in gas purchase contracts. Mr. Maybin argued that the maximum daily limitation was not in itself sufficient because although the spread between the average day and maximum day that now exists is only in the order of 10 per cent, it may not remain so during the entire term of the permit. The Utility Companies did not make a new estimate of Alberta's requirements for gas since the estimate they submitted at the Trans-Canada hearing in February, 1966. They urged the Board to accept that estimate for the purposes of this application.

Atlantic Richfield Company and Sinclair Canada Oil Company

Atlantic and Sinclair supported the application. Their submission concerned primarily the Gold Creek Field. They argued that the field should be included in the amended permit because, on the basis of a preliminary study, cycling does not appear attractive. Detailed studies are now in progress which they believe will confirm the conclusions of the preliminary work. Atlantic and Sinclair contended that even if cycling is desirable, a small amount of production may be taken from the field without affecting the recovery of natural gas liquids.

Mobil Oil Canada, Ltd.

Mobil Oil restricted its intervention to the question of whether or not the Carson Creek and Carson Creek North Fields should remain in the permit. Mr. W. R. Donahue, the witness for Mobil Oil, stated that an application has been made to the Board for permission to sell a small, and in his opinion, reasonable, amount of gas from the fields. He believed the Board would approve the application. Therefore, he contended that both fields should remain in the permit.

Pan American Petroleum Corporation

Pan American supported Alberta and Southern's application. It had also made some preliminary studies of the Gold Creek Field, the results of which suggested that cycling of the field is not desirable. Pan American stated that a limited volume of gas should be produced from the field to determine if reservoir continuity exists and to better evaluate the possibility of cycling. It considered that limited production would not jeopardize a cycling scheme if one should prove to be feasible. Therefore, Pan American contended that the Gold Creek Field should be included in the permit applied for.

V BASIS OF CONSIDERATION

Contractable Reserves

(1) Views of Alberta and Southern

The applicant suggested that not all of the reserves of gas considered by the Board to be beyond economic reach should be categorized as being non-contractable. Alberta and Southern contended that in the past there have been instances of reserves being placed under contract in areas considered by the Board to be beyond economic reach.

The applicant urged the Board to be a little more liberal in estimating the contractable reserves in the Province.

(2) Views of the Board

In its estimate of contractable reserves, the Board does not include any reserve which at the time of the assessment is considered to be beyond economic reach or which is deferred by reason of oil production or for pressure maintenance purposes. The Board deems reserves to be beyond economic reach if they are of insufficient size to be connected economically into existing gas pipe lines or into pipe lines not yet constructed but which the Board expects to be built within a year or two.

The Board agrees that there have been instances where reserves considered beyond economic reach have in fact been the subject of a contract. There have also been instances where reserves under contract have not been connected to pipe lines because they are not of sufficient size to make the connection economical. In the latter instances the contracts have been of a type that requires the producers to prove a specified volume of gas before a pipe line connection is made.

The Board believes that since contractable reserves are used to satisfy present requirements and present permit commitments, it should not be too liberal in its estimate of them. However, where it has knowledge that gas in areas it considered as being beyond economic reach has been made subject of a contract and that gas deliveries will commence on a specified date, the Board has in the past and will continue to reclassify the reserve as being within economic reach and will include the reserve in the contractable category.

Deliverable Volumes

(1) Views of Alberta and Southern

Although the applicant's own deliverability schedule showed that not all of the gas applied for will be delivered during the term of the permit, Alberta and Southern urged the Board not to reduce the volume requested to the level shown as being deliverable. The applicant contended that the schedule is illustrative only, that the deficiency is small in relation to the total volume to be removed and that there are many uncertainties in estimating deliverability from a large group of fields over a period as long as twenty-five years. The applicant believes that all of the requested volume can be produced during the term of the amended permit.

(2) Views of Interveners

The Utility Companies, the only interveners who spoke to this matter, said that the volume specified in the permit should be limited to the amount of gas that "appeared could be produced" from the fields named in the permit.

(3) Views of the Board

The Board recognizes that a deliverability schedule is illustrative and that there are many uncertainties in a prediction of the amount of gas that may be produced from a group of fields over an extended period of time. The Board has found that the amount of gas shown as being available on deliverability schedules has generally been conservative. The drilling of additional wells, the installation of more compression, and the increased use of storage has resulted in more gas being produced. Nevertheless, the Board believes that the volume of gas specified in a permit should be one that under good production practices may reasonably be produced within the term of the permit.

Gold Creek, Carson Creek and Carson Creek North Fields

(1) Views of Alberta and Southern

As discussed earlier in this report, the applicant urged the Board to include the Gold Creek Field by the amendment of the permit applied for, and to leave the Carson Creek and Carson Creek North Fields in the permit. Alberta and Southern conceded that gas from these fields may not be available to it immediately due to cycling operations. However, it argued that some time during the term of the permit cycling would no longer be economical and the gas would then be available to the applicant.

(2) Views of Interveners

Pan American, Mobil Oil and Atlantic and Sinclair, those of the owners of gas in these fields who appeared at the hearing, agreed that some form of cycling may be desirable. However, they argued that it may not be harmful, and in the case of the Gold Creek Field it would indeed be beneficial to produce some gas from the fields. Therefore, they urged the Board to include the fields in the permit.

(3) Views of the Board

In the case of the Carson Creek and Carson Creek North Fields, the Board has recently approved the sale of limited volumes of gas. In view of this, and because the Board believes that essentially all of the gas in the fields will be produced during the term of the permit, the Board agrees that both fields should be included in the permit.

From analyses of the reservoir fluid, the Board believes that the Gold Creek reservoir is of the retrograde type, and that the gas is sufficiently rich to make cycling economical if the gas bearing zone is continuous from well to well. Since the pool pressure is well in excess of the dew point pressure and a modest reduction in the pressure will not cause a loss in liquid recovery, the Board believes that some gas should be produced from the field to determine if the reservoir possesses sufficient continuity to be cycled. The Board calculates that some 100 billion cubic feet of gas could be produced without causing a reduction in liquid recovery. Therefore, the Board believes that the Gold Creek Field should be included in an amended permit if one be issued, but the volume of gas that may be removed from the field should be limited to 100 billion cubic feet. If the studies now underway and the data to be obtained in the field convince the Board that cycling is not warranted, the limitation could be removed by later amendment to the permit.

Extension of Term of Permit

(1) Views of Alberta and Southern

The Permittee applied for a change in the date upon which the term of the permit ends from October 31, 1989, to October 31, 1993. Its witness, Mr. Blair, stated that its gas supply contracts for the new fields provide for first delivery on or about November 1, 1968, and have a term of twenty-five contract years. The amendment applied for would extend the permit to cover the approximate term of these gas supply contracts.

(2) Views of the Board

The amendment proposed by Alberta and Southern would place the expiry date approximately 27 years into the future. In other suitable applications the Board has extended the terms of permits so that they would run a further twenty-five years from the time of the amendment. The period of twenty-five years is felt by the Board to be a suitable one for this purpose, and it would appear to have received some recognition and acceptance from permittees who have applied in the past for extensions of the terms of their permits. Under this policy and in view of the applicant's desire to have each permit year end on October 31, the expiry date of the permit could be changed to October 31, 1991.

Later removal of Volumes Authorized but not Removed

(1) Views of Alberta and Southern

In giving evidence in support of the application for the addition of a provision that the annual maximum volume of gas that may be removed might be augmented in any permit year by a quantity of gas that in an earlier year could have been removed within the limitations of the permit but had not been removed, Mr. Blair stated it is not practical to endeavour to maintain the annual quantity constant in each year. He said the stipulated annual maximum was about 90 per cent of what the annual maximum would be if it were controlled by the maximum daily volumes and, as compared to this 90 per cent, the applicant's sales may vary from 80 per cent to as near 100 per cent as pipe line facilities could handle. If the proposed amendment were made, the augmented volumes could exceed the stipulated annual maximum by 10 per cent at the most, and more likely by 6 or 8 per cent, in view of the capacity of the pipe line by which the gas is delivered to the applicant's customers. Further, Mr. Blair pointed out that the volumes to be removed from the Province would remain subject to the maximum daily volume limitation and the total limit for the term of the permit.

(2) Views of the Utility Companies

The Utility Companies in their intervention submitted that this part of the application should not be granted exactly in the form requested, but rather the make-up period should be limited to a number of years, say 2 or 3. Their witness, Mr. Maybin, stated that there would be no harm in allowing the permittee some flexibility to make up volumes on which it had fallen behind if there were suitable limitations. He added that the maximum day limit is a logical limit on the rate at which a back-log may be made up, but there should also be a limit on the period over which the back-log may be made up. It is desirable for permits to be kept current and the proposed limitation would provide an incentive to this end. Otherwise it would be possible, in Mr. Maybin's view, for a large back-log to accumulate to the point where it became a question whether the permittee would ever use it, and in that event, it would be better if the gas was released from the permit and put to some other purpose. Further, Mr. Maybin stated that the spread between the average daily volume and the maximum daily volume was not large now, but that if the spread should be increased the maximum daily volume would be less satisfactory as a limitation on the proposed make-up privilege.

(3) Views of the Board

The Board is of the opinion that the flexibility in the annual volumes removable sought by the Permittee, is desirable to enable the Permittee to realize fully the benefit of the permit. The limitation provided in this and any other permit by the maximum day volume should adequately prevent any excessive augmentation for an annual volume, and contractual obligations will tend to prevent the accumulation of a substantial back-log.

As the applicant's expressed reason for seeking this amendment is the desire for flexibility to meet year to year variations in its customers' requirements, the Board is of the opinion that the time over which a back-log may accumulate should be limited and that such year to year variations should even out over a period of three or four years.

VI FINDINGS

The Board having heard publicly the application under The Gas Resources Preservation Act, 1956, of Alberta and Southern Gas Co.Ltd., and having studied the evidence submitted by the applicant and the interveners at the public hearing, and having regard to the advice of its staff, to its own knowledge, and to its responsibility under the Act, finds as follows:

1. IN THE MATTER OF THE ESTABLISHED RESERVES OF GAS IN ALBERTA

The Board estimates the established reserves of marketable gas in the Province of Alberta as of June 30, 1966, to be some 37.7 trillion cubic feet, or the equivalent of 40.1 trillion cubic feet of 1000 Btu gas.

Of the latter total, some 2.4 trillion cubic feet of gas is now considered to be beyond economic reach and some 4.9 trillion cubic feet will have its production deferred, leaving a contractable reserve of 32.8 trillion cubic feet of 1000 Btu gas.

The current estimate of reserves is some 0.2 trillion cubic feet less than the Board's estimate at February 28, 1966. The reduction is due to production since the previous estimate.

Details of the Board's estimate are presented in Appendix A.

2. IN THE MATTER OF THE TRENDS IN EXPLORATION AND THE GROWTH OF RESERVES OF GAS IN ALBERTA

Since 1951 the average growth in initial marketable reserves of gas due to new discoveries and to appreciation of previous discoveries has been at the rate of some 2.5 trillion cubic feet per year. Over the past two years (July 1, 1964, to June 30, 1966), the actual annual rate was 1.85 trillion cubic feet.

Although the appreciation of recent discoveries appears normal, the reduction in the estimate of reserves in certain fields, particularly in the Pine Creek and Pincher Creek Fields, and the gas discoveries in the Province, which to date appear to have been modest, has resulted in the lower overall growth rate during the recent two-year period.

The Board's policy with respect to additional reserves to be used in satisfying the remaining requirements of Alberta, stated in its previous reports, is to use reserves equivalent to those that would be developed in a two-year period at the long term growth rate, or the amount developed during the immediately preceding two-year period, whichever is the lesser. The additional reserves to assist in meeting the remaining requirements of Alberta determined on this basis amount to some 3.7 trillion cubic feet.

The Board believes that while it is proper to continue this policy, the lower recent growth rate does not reflect a new long term trend but rather is an indication of the cyclic nature of the discovery and development of gas reserves.

Details of the Board's estimate of the growth of reserves in Alberta are presented in Appendix B.

3. IN THE MATTER OF THE PRESENT AND FUTURE REQUIREMENTS OF ALBERTA FOR GAS AND THE PRESENT PERMIT COMMITMENTS

The Board estimates the requirements of Alberta for 1000 Btu gas for the thirty-year period, July 1, 1966, to June 30, 1996, to be some 12.2 trillion cubic feet, with a peak day requirement in the thirtieth year of about 2.7 billion cubic feet. The present estimate represents an increase of 0.3 trillion cubic feet in the total thirty-year requirements and 0.1 billion cubic feet in the thirtieth year peak day since the Board's estimate for the period January 1, 1966, to December 31, 1995.

The remaining commitments as of June 30, 1966, associated with permits issued for the removal of gas from Alberta, total some 22.3 trillion cubic feet of 1000 Btu gas.

Details of the Board's estimates of requirements and permit commitments are presented in Appendix C.

4. IN THE MATTER OF THE MEETING OF THE THIRTY-YEAR REQUIREMENTS OF ALBERTA AND THE PRESENT PERMIT COMMITMENTS, AND THE RESULTING SURPLUS

The Board estimates that reserves totalling some 18.4 trillion cubic feet of 1000 Btu gas are necessary to meet the annual and peak day requirements of Alberta for the thirty-year period, July 1, 1966, to June 30, 1996. Of this total about 12.2 trillion cubic feet are required for actual deliveries with the remaining 6.2 trillion cubic feet needed to meet the thirtieth year peak day.

The Board's estimate of 18.4 trillion cubic feet may also be considered to consist of 6.4 trillion cubic feet of contractable requirements and 12.0 trillion cubic feet of remaining requirements, the latter being a measure of the amount of reserves needed from sources not now under contract or connected to the Alberta market.

The Board estimates that 23.1 trillion cubic feet of 1000 Btu gas are required to meet the present permit commitments of which some 0.8 trillion cubic feet represent the reserves required to ensure deliverability in the terminal year for those permits under which it is contemplated that substantial daily withdrawals for which protection has historically been provided will continue to the end of the term.

Deducting the contractable requirement of 6.4 trillion cubic feet and the gas needed to satisfy the permit commitments, 23.1 trillion cubic feet, from the contractable reserves of 32.8 trillion cubic feet leaves a contractable surplus of 3.3 trillion cubic feet.

The remaining and future reserves consist of 4.2 trillion cubic feet of deferred gas which will be available within the thirty-year period, 1.8 trillion cubic feet of gas now beyond economic reach but which is estimated will be within economic reach within thirty years, and 3.7 trillion cubic feet representing the growth of gas reserves experienced during the preceding two years, giving a total of 9.7 trillion cubic feet. Comparing this total with the 12.0 trillion cubic feet of remaining Alberta requirements indicates, in this future category, a deficiency of 2.3 trillion cubic feet. This results after full provision for the 4.6 trillion cubic feet required from sources not now connected to meet Alberta's thirtieth year peak day. It does not allow for the 0.8 trillion cubic feet which would be available upon the termination of certain of the permits.

Combining the contractable surplus of 3.3 trillion cubic feet with the indicated future deficiency of 2.3 trillion cubic feet results in an overall surplus of 1.0 trillion cubic feet before the release of cushion gas. The cushion gas released after the expiration of the subsisting permits will increase the overall surplus to 1.8 trillion cubic feet.

Details of the Board's analyses of these matters appear in Appendix D.

5. IN THE MATTER OF THE VOLUMES UNDER CONTRACT AND THE PERMIT VOLUME APPLIED FOR BY ALBERTA AND SOUTHERN GAS CO. LTD.

The Board finds that Alberta and Southern has under contract some 80 per cent of the reserves, as estimated by the Board, within the fields, pools and areas which the applicant applied to have added to its permit. Furthermore, with the exception of the Simonette Field, where the reserves totalling some 132 billion cubic feet are not under contract to the applicant, and which the Board believes should not be included in the permit, Alberta and Southern has under contract a sufficient portion of the reserves in each field, pool or area to warrant their inclusion in the permit.

6. IN THE MATTER OF THE APPLICANT'S APPLICATION FOR AUTHORIZATION FOR THE REMOVAL OF ADDITIONAL QUANTITIES OF GAS AND THE SURPLUS WHICH WOULD RESULT IF THE APPLICATION WERE GRANTED

Alberta and Southern applied for authority to remove an additional 1.68 trillion cubic feet of gas, consisting of some 0.7 trillion cubic feet from fields included in its present permit and approximately 1.0 trillion cubic feet from new fields. While the Board disagrees with the applicant's estimate of reserves in certain of the new fields and in some of the fields now in the permit, the Board's estimate of the total reserves available in both groups of fields exceeds the amount requested by the applicant by some 0.3 trillion cubic feet.

If the increased volume applied for should be granted, the reserves needed to meet the commitment of all permits would increase from the present 23.1 trillion cubic feet of 1000 Btu gas, of which 0.8 trillion cubic feet is for the protection of deliveries at the maximum daily rate authorized and anticipated in certain of the permits, to 24.8 trillion cubic feet.

The additional volume applied for would reduce the contractable surplus from 3.3 trillion cubic feet to some 1.6 trillion cubic feet. The overall surplus of 1.0 trillion cubic feet, before the release of the cushion gas associated with certain of the permits, would become a deficiency of 0.7 trillion cubic feet. The release of the cushion gas after the expiration of the permits would eliminate the deficiency and result in a surplus of 0.1 trillion cubic feet.

The Board believes that the small deficiency indicated prior to the release of cushion gas is not significant because of the various alternatives available for the meeting of Alberta's thirtieth year peak day requirements and the abnormally low allowance for the two years growth of gas reserves used in the assessment.

Accordingly, the Board finds that the additional volume of gas for which the applicant applied is surplus to the requirements of the Province and the present permit commitments and may be produced within a twenty-five year term - although the Board estimates that the reserves would not support deliveries at the maximum daily rate requested during the last several years of the term.

Details of the Board's analyses relating to these matters are presented in Appendix E.

7. IN THE MATTER OF THE OTHER AMENDMENTS APPLIED FOR BY ALBERTA AND SOUTHERN GAS CO. LTD.

(1) The application for an extension in the term of its permit

The Board agrees with the applicant that the addition to reserves, the delivery characteristics of the fields, and the contracts which Alberta and Southern has entered into make an extension of the term of the permit desirable. However, in keeping with its past practice, the Board believes that the extension should be for a period of not more than twenty-five years from the date the amendment is issued.

(2) The application for a provision that volumes of gas authorized but not removed during a year be removed in subsequent years

The Board agrees with the applicant that it is not practical to maintain the annual quantity of gas removed constant in each year, and believes that the flexibility sought by the applicant is desirable to enable the permittee to realize fully the benefit of the permit. The Board is satisfied that the maximum day limitation in the permit will provide some control over the volumes to be removed, but believes that the permit should be amended to allow the applicant to adjust its removals of gas to its sales over a four-year period.

A discussion of these aspects of the application appears in Section V.

8. IN THE MATTER OF THE DELETION FROM AND ADDITION TO THE PERMIT OF CERTAIN FIELDS

The Board agrees with Alberta and Southern that the Westerose Field should be deleted from the subsisting permit, since the gas is under contract to another buyer and thus is not available to the applicant.

The Board finds that Alberta and Southern does not have gas purchase contracts in the Burnt Timber Field and the Fox Creek West Field and believes these fields should be removed from Permit No. AS 64-3.

Since the Board has approved the sale of limited volumes of gas from the Carson Creek and Carson Creek North Fields, and since the applicant has almost all of the reserves in the fields under contract, the Board believes they should remain in the permit.

With respect to the new fields applied for, the Board believes that, since Alberta and Southern does not have contracts for any of the gas in the Simonette Field, that field should not be included in the permit. For reasons discussed in Section V, the Board believes the Gold Creek Field should be included in the permit, but only 100 billion cubic feet of the total of 500 billion cubic feet of reserves should be permitted to be removed from the Province.

In all other fields, pools and areas now included in the permit or applied for, the applicant has under contract a sufficient portion of the Board's estimate of the reserves in each field, pool or area to justify their retention or inclusion in the permit.

9. IN THE MATTER OF THE DISPOSITION OF THE APPLICATION OF ALBERTA AND SOUTHERN GAS CO. LTD.

All things considered, the Board is prepared, with the approval of the Lieutenant Governor in Council, to amend Permit No. AS 64-3 by increasing the volume of gas which Alberta and Southern may remove from the Province by 1.68 trillion cubic feet, by deleting from the list of fields, pools and areas from which gas may be removed, the Burnt Timber Field, the Fox Creek West Field, and the Westerose Field, and by adding seven of the eight new fields and pools applied for, by extending its term to October 31, 1991, and by making other amendments applied for by the applicant; the amendment of permit to be in the form shown in Appendix F and subject to the terms and conditions therein contained.

Respectfully submitted,

G. W. Govier, P. Eng.
Chairman

A. F. Manyluk, P. Eng.
Deputy Chairman

Vernon Millard,
Board Member

DATED at Calgary, Alberta
this 25th day of January, A.D. 1967.

APPENDIX A

THE ESTABLISHED RESERVES OF GAS IN ALBERTA

The Board estimates that the initial marketable reserves of gas in Alberta have remained constant over the four-month period ending June 30, 1966, at some 46.4 trillion cubic feet, although there were changes in the estimates in some fields and areas due to a re-evaluation of certain geological and engineering factors employed in the estimates.

To June 30, 1966, a total of some 6.3 trillion cubic feet of marketable gas has been produced. Therefore, the remaining marketable gas at June 30, 1966, is estimated to be 40.1 trillion cubic feet, a decrease of some 0.2 trillion cubic feet since February 28, 1966. The reduction in the present estimate is due to production since the previous estimate and to the reappraisal of certain reserves. The Board considers that 37.7 trillion cubic feet of the total of 40.1 trillion cubic feet are now within economic reach. Some 4.9 trillion cubic feet of the total reserves constitute reserves deferred by reason of oil production or pressure maintenance operations. The present estimate of 4.9 trillion cubic feet is some 0.3 trillion cubic feet less than the Board's estimate at February 28, 1966. The reduction is due primarily to the transfer of the Carson Creek and Carson Creek North Fields from the deferred category to the contractable category.

Alberta and Southern estimated reserves for only those fields or areas from which it may now remove gas and for those fields or areas applied for. None of the interveners submitted evidence on the reserves of gas. Therefore, there is no other provincial gas reserve estimate available for comparative purposes.

The Board, in its estimate of reserves, has considered evidence presented at the hearing by Alberta and Southern, evidence presented by various persons at other times during the previous years and evaluations completed by its staff.

The Board's current estimate of reserves in the fields from which the applicant is now removing, or expects to be removing gas, plus the reserves in fields or areas from which it proposes to remove gas, agrees in total with that presented by Alberta and Southern. While there is agreement in total, there are important differences in the estimates for some of the individual fields. The more significant differences and the reasons for variation are presented in the following tabulation:

Field or Area	Zone	Estimator	Initial Established Reserves Bcf	Remarks
Fox Creek	Viking	Alberta and Southern	119	Alberta and Southern estimates larger areal extent and slightly less reservoir loss.
		Board	69	
Gold Creek	Wabamun	Alberta and Southern	367	Alberta and Southern estimates less pore volume and excludes one assignment included in the Board's estimate for the area.
		Board	500	
Kaybob	Notikewin	Alberta and Southern	325	Alberta and Southern estimates greater rock volume.
		Board	280	

Field or Area	Zone	Estimator	Initial Established Reserves Bcf	Remarks
Kaybob South	Cadomin	Alberta and Southern	25	Board estimates greater areal extent and less reservoir loss.
		Board	60	
Minnehik-Buck Lake	Pekisko	Alberta and Southern	505	Board estimates less rock volume.
		Board	450	
Wildhorse Creek	Rundle	Alberta and Southern	164	Alberta and Southern estimates greater rock volume.
		Board	100	

During the period February 28, 1966, to June 30, 1966, over the Province as a whole, the Board has made some changes in the estimate of initial marketable reserves in certain of the previously known pools. Five of the pools where significant changes were recorded are listed and discussed briefly in the following paragraphs:

Fox Creek Viking reserve estimates have been increased by the Board from 5 billion cubic feet to 69 billion cubic feet during the four-month period under consideration. Reserves previously included in the Fox Creek and Fox Creek North areas and a portion of the Fox Creek West area have been combined with one well from the Kaybo South area to form an enlarged Fox Creek area. In addition, the completion of a new well has resulted in the mapping of a portion of the area previously containing reserves based only on acreage assignments.

Kaybob South Beaverhill Lake reserve estimates have been increased by the Board from 15 billion cubic feet as of February 28, 1966, to 110 billion cubic feet as of June 30, 1966. The increase of some 95 billion cubic feet is due to the completion of three new wells that have added substantial proven acreage to the areal extent of the pool.

Pembina Cardium solution gas reserves have been the subject of a recent preliminary review by the Board staff. It appears certain that calculations of the initial recoverable gas reserves of areas subject to the various oil recovery mechanisms estimated at February 28, 1966, to be some 1,120 billion cubic feet, have been optimistic. Based on the preliminary study, initial marketable reserves are estimated to be 900 billion cubic feet as of June 30, 1966. The study will be expanded and continued in more detail to establish the accuracy of the preliminary estimate. The operators in the Pembina Cardium Pool have been invited to submit at the annual reserves hearing their estimate of the reserves of gas in the pool. The findings from the study and the hearing will be discussed in the Board's 1966 year-end reserve publication.

Pine Creek Leduc reserve estimates have been reduced by the Board from 330 billion cubic feet as of February 28, 1966, to 200 billion cubic feet as of June 30, 1966. The reduction is due to a decrease in areal extent resulting from geological re-evaluation and a decrease in the reservoir recovery factor from 50 per cent to 40 per cent necessitated by pool production history.

Waskahigan Dunvegan reserve estimates have been increased by the Board from some 30 billion cubic feet to 50 billion cubic feet for the period ending June 30, 1966, due to the drilling of one new well. The new well has resulted in an increase in the proved area of the pool.

The Board's estimates of established reserves are presented in Table A-1. The table does not show individually fields or areas having a marketable reserve of less than 10 billion cubic feet unless the reserve is supplying a market. In addition, the table does not show individually fields or areas in which the data used in calculating the reserve are confidential. However, the sum of the reserves for non-producing fields or areas having a reserve of less than 10 billion cubic feet and the sum of the reserves for confidential fields or areas are shown at the end of the table, and are included in the provincial total. The fields and areas contained in Table A-1 are shown in Figure A-1.

TABLE A-1

OIL AND GAS CONSERVATION BOARD

ESTABLISHED RESERVES OF GAS IN THE PROVINCE OF ALBERTA, JUNE 30, 1966

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30,1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30, 1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU.FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
ACHESON	VIKING	6	25/5	4	1	3	1020*	3	GAS SOLD TO NORTHWESTERN UTILITIES, LIMITED
	BASAL BLAIRMORE	37	20/15	25	3	22	1020	22	
	LEDUC SOLUTION	68	35/55	20	5	15	1140	17	
ACHESON EAST	BASAL BLAIRMORE	12	15/5	10	-	10	1090	11	
ADEN	BOW ISLAND	5	20/5	4	-	4	1000	4	GAS SOLD TO CANADIAN-MONTANA GAS COMPANY LTD.
	BASAL COLORADO	6	15/5	5	1	4	1000	4	
	SUNBURST-SWIFT	3	20/5	2	1	1	1040	1	
	MISSISSIPPIAN	12	10/10	10	5	5	1040	5	
ALDERSON	MILK RIVER	32	25/5	23	5	18	960	17	SUPPLIES LOCAL UTILITY INCLUDES AREAS FORMERLY KNOWN AS SUFFIELD, SUFFIELD SOUTH, ROLLING HILLS, AND ALDERSON EAST
	SECOND WHITE SPECKS	280	25/5	200	-	200	995	199	
	BOW ISLAND	28	25/5	20	-	20	1000	20	
	BASAL COLORADO	12	15/5	10	-	10	1030	10	
ALEXANDER	BASAL BLAIRMORE	130	10/5	110	100	10	1060*	11	GAS SOLD TO NORTH CANADIAN OILS LIMITED AND CALGARY POWER LTD.
ALIX	BASAL BLAIRMORE	12	10/5	10	-	10	1090	11	
	NISKU ASSOC. AND NON ASSOC.	9	15/10	7	-	7	1130	8	
ANTELOPE	VIKING	20	20/5	15	1	14	1020	14	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED
	BANFF	13	20/5	10	3	7	1020	7	
ATHABASCA	GRAND RAPIDS	6	15/5	5	1	4	1000*	4	SUPPLIES LOCAL UTILITY.
	WABAMUN	4	10/5	3	-	3	980*	3	
ATHABASCA EAST	MANNVILLE	1	20/5	1	-	1	1090	1	SUPPLIES LOCAL UTILITY.
	WABAMUN	2	10/5	2	1	1	1000	1	

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30,1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30,1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU.FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
Atim	Viking	1	20/5	1	-	1	1000	1	Gas sold to Canadian Industrial Gas & Oil Ltd.
	Mannville	2	15/5	2	1	1	1070	1	
Atlee-Buffalo	Bow Island	120	25/5	85	10	75	970*	73	Gas sold to Trans-Canada Pipe Lines Limited.
	Basal Colorado	7	15/5	6	-	6	1020	6	
	Basal Blairmore	72	20/5	55	-	55	960*	53	
Bantry	Milk River	46	20/5	35	1	34	960	33	Supplies local utility.
	Basal Colorado	3	20/5	2	-	2	970	2	
	Bow Island	26	20/5	20	-	20	970	19	
	Mannville	37	15/5	30	2	28	1030	29	
	Mannville Assoc.	38	10/10	31	-	31	1160	36	
Baptiste	Mannville	1	20/5	1	-	1	970	1	
	Wabamun	14	20/5	11	-	11	980	11	
Bashaw	Viking	1	25/5	1	-	1	970	1	
	Basal Blairmore	25	15/5	20	-	20	970	19	
	Leduc Assoc.	18	20/15	12	-	12	1220	13	
Bawlf	Viking	21	25/5	15	-	15	1020	15	Presently considered beyond economic reach.
	Blairmore	5	30/5	3	-	3	1050	3	
Beaver Crossing	Colony	2	30/5	1	-	1	1000	1	Supplies local utility.
Beaverhill Lake-Fort Saskatchewan	Viking	620	15/5	500	96	404	1020*	412	Gas sold to North-western Utilities, Limited and Canadian Industrial Gas & Oil Ltd.
	Blairmore	4	15/5	3	-	3	1000	3	
Bellis	Mannville	7	20/5	5	-	5	1000	5	
	Nisku	45	15/5	36	-	36	1000	36	
Belloy	Notikewin	9	20/5	7	-	7	1000	7	
	Gething	62	15/5	50	-	50	1000	50	
	Mississippian	23	10/5	20	-	20	1120	22	
Bellshill Lake	Viking	6	25/5	4	-	4	1040	4	Presently considered beyond economic reach.
	Blairmore	37	15/5	30	-	30	990	30	
	Blairmore Assoc.	3	15/10	2	-	2	990	2	

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30, 1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30, 1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU. FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
Benjamin Creek	Mississippian	100	15/20	70	-	70	1070	75	
Berland River	Leduc	440	10/25	300	-	300	1000	300	
Berland River West	Wabamun	24	10/30	15	-	15	1020	15	Presently considered beyond economic reach.
Bigoray	Blairmore	14	15/5	11	-	11	1080	12	
	Mississippian	13	15/10	10	-	10	1080	11	
Bigstone	Gething	23	10/5	20	-	20	1100	22	
	Dunvegan	29	10/5	25	-	25	1140	28	
	Wabamun	10	15/40	5	-	5	1050	5	
	Leduc	390	15/25	250	-	250	930	230	
Bindloss	Viking	430	15/5	350	80	270	980*	265	Gas sold to Trans-Canada Pipe Lines Limited.
	Basal Blairmore	31	15/5	25	-	25	990	25	
Bittern Lake	Viking	3	25/5	2	-	2	1020	2	
	Blairmore	62	15/5	50	-	50	1070	54	
Black Butte	Bow Island	21	15/5	17	2	15	1010	15	Gas sold to Canadian-Montana Gas Company Ltd.
	Basal Colorado	25	15/5	20	7	13	1000	13	
	Blairmore	6	15/5	5	-	5	1000	5	
	Sunburst-Ellis	35	10/5	30	22	8	1000	8	
	Mississippian	11	15/5	9	3	6	1020	6	
Blueridge	Detrital	14	10/5	12	-	12	1100	13	Presently considered beyond economic reach.
	Mississippian	1	20/5	1	-	1	1130	1	
Bolloque Lake	Viking	3	25/5	2	-	2	1040	2	Presently considered beyond economic reach.
	Basal Blairmore	14	25/5	10	-	10	1100	11	
Bonnie Glen	Cardium Solution	1	15/10	1	-	1	1040	1	Gas sold to North-western Utilities, Limited.
	Viking	3	15/10	2	-	2	1050	2	
	Blairmore	5	15/10	4	3	1	1100	1	
	Leduc Assoc.	460	15/15	330	6	324	1220	395	
	Leduc Solution	530	35/25	260	40	220	1220	270	
Bonnyville	Blairmore	6	25/5	4	2	2	980	2	Supplies local utility.

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30, 1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30, 1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU. FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
BOUNDARY LAKE SOUTH	CADOMIN	10	15/5	8	-	8	1060	8	GAS SOLD TO WESTCOAST TRANSMISSION COMPANY LIMITED.
	BOUNDARY LAKE	1	15/10	1	-	1	1050	1	
	MISSISSIPPIAN	58	15/5	47	15	32	1040*	33	
BOW ISLAND	BOW ISLAND	20	20/5	15	-5	20	1110	22	CANADIAN WESTERN NATURAL GAS COMPANY LIMITED STORAGE RESERVOIR.
BOYLE	BLAIRMORE	3	20/5	2	-	2	1000	2	
	DETRITAL	1	15/5	1	-	1	1000	1	
	NISKU	10	15/5	8	-	8	990	8	
BRAEBURN	CADOMIN	4	15/5	3	-	3	1060	3	GAS SOLD TO WESTCOAST TRANSMISSION COMPANY LIMITED.
	TRIASSIC	33	15/10	25	3	22	1090	24	
	PERMO-PENN	52	15/10	40	2	38	1030	39	
BRAZEAU RIVER	MISSISSIPPIAN	390	15/10	300	-	300	1040	312	
BROOKS	MILK RIVER	9	20/5	7	3	4	990	4	SUPPLIES LOCAL UTILITY.
BROWN CREEK	MISSISSIPPIAN	59	20/15	40	-	40	970	39	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
BRUCE	VIKING	27	25/5	19	-	19	1000	19	
	MANNVILLE	7	20/10	5	-	5	1020	5	
BURNT TIMBER	MISSISSIPPIAN	390	20/20	250	-	250	1080	270	
CALAIS	GETHING	9	15/5	7	-	7	1000	7	SUPPLIES LOCAL UTILITY.
	LEDUC ASSOC.	1	10/25	1	-	1	1080	1	
CALLING LAKE	MANNVILLE	3	25/5	2	-	2	1000	2	
	NISKU	49	25/5	35	-	35	1000	35	
CAMPBELL-NAMAO	BLAIRMORE NON-ASSOC., ASSOC. & SOLUTION	38	20/5	29	13	16	1020	16	GAS SOLD TO CANADIAN INDUSTRIAL GAS & OIL LTD.
CARBON	BELLY RIVER	1	20/5	1	-	1	990	1	GAS SOLD TO CANADIAN WESTERN NATURAL GAS COMPANY LIMITED
	VIKING	5	20/5	4	-	4	1020	4	
	BASAL COLORADO	4	15/5	3	-	3	1020	3	
	BLAIRMORE	160	15/10	120	11	109	1100	120	

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30, 1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30, 1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU.FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
CAROLINE	VIKING	140	20/10	97	-	97	1130	110	
	BLAIRMORE	39	15/10	30	-	30	1070	32	
	MISSISSIPPIAN	26	15/10	20	-	20	1020	20	
CARSON CREEK	BEAVERHILL LAKE	320	15/15	230	-4	234	1050	246	RESERVOIR BEING CYCLED.
CARSON CREEK NORTH	BEAVERHILL LAKE ASSOC.	28	15/15	20	-	20	1100	22	GAS INJECTED INTO CARSON CREEK.
	BEAVERHILL LAKE SOLUTION	440	60/20	140	4	136	1100	150	
CARSTAIRS	BASAL BLAIRMORE	5	15/10	4	-	4	1100	4	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	MISSISSIPPIAN	1100	15/10	860	174	686	1110*	754	
CASTOR	VIKING	7	25/5	5	-	5	1090*	5	SUPPLIES LOCAL UTILITY.
	BLAIRMORE	4	10/5	3	1	2	1090*	2	
CESSFORD	VIKING	110	20/5	83	7	76	1020*	77	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	BASAL COLORADO	1200	15/5	990	278	712	1020	726	
	BASAL BLAIRMORE	470	20/5	360	67	293	1030*	302	
CHARLOTTE LAKE	BLAIRMORE	1	25/5	1	-	1	1000	1	SUPPLIES RCAF STATION AT COLD LAKE.
CHIGWELL	BLAIRMORE	74	10/10	60	9	51	1100*	56	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
CHINOOK RIDGE	PADDY	11	10/10	9	-	9	1020	9	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	CADOTTE	28	10/10	23	-	23	1020	23	
	NOTIKEWIN	19	10/10	15	-	15	1020	15	
CHISHOLM	BLAIRMORE	12	10/5	10	-	10	1020	10	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
CLEAR HILLS	GETHING	2	15/5	2	-	2	980	2	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	TRIASSIC	8	10/5	7	-	7	1030	7	
	LEDUC	4	15/5	3	-	3	1070	3	
CLIVE	VIKING	4	20/5	3	-	3	990	3	
	BLAIRMORE	6	15/5	5	-	5	1020	5	
	NISKU ASSOCIATED	15	15/30	9	-	9	1150	10	
	LEDUC ASSOCIATED	24	10/25	16	-	16	1200	19	

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FIELD OR AREA	ZONE	INITIAL GAS IN PLACE BCF	LOSSES RESERVOIR/SURFACE PER CENT	INITIAL MARKETABLE GAS BCF	MARKETABLE GAS PRODUCED TO JUNE 30,1966 BCF	REMAINING MARKETABLE GAS JUNE 30,1966 BCF	ESTIMATED HEATING VALUE BTU/CU.FT.	REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	REMARKS
COLD LAKE	BLAIRMORE	8	30/5	5	3	2	1000	2	SUPPLIES LOCAL UTILITY.
COMREY	SECOND WHITE SPECKS	5	20/5	4	-	4	940	4	GAS SOLD TO CANADIAN-MONTANA GAS COMPANY LTD.
	BOW ISLAND	29	10/5	25	15	10	940	9	
	SAWTOOTH	1	20/5	1	-	1	1000	1	
CONNORSVILLE	VIKING	8	20/5	6	1	5	990	5	GAS SOLD TO TRANS-CANADA PIPE LINES LTD.
	BASAL BLAIRMORE	62	15/5	50	2	48	1130	54	
COUNTESS	BOW ISLAND	92	20/5	70	4	66	1000*	66	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	BASAL COLORADO	140	25/5	100	53	47	1000*	47	
	BASAL BLAIRMORE	43	20/5	33	3	30	1020*	31	
	MISSISSIPPIAN	2	15/5	2	-	2	960	2	
	MISSISSIPPIAN ASSOC.	3	20/10	2	-	2	960	2	
CRAIGEND	BLAIRMORE	13	25/5	9	-	9	1000	9	
	GROSMONT	240	25/5	170	-	170	1000	170	
CRAIG LAKE	VIKING	9	20/5	7	-	7	1000	7	SUPPLIES LOCAL UTILITY.
CROSSFIELD	CARDIUM SOLUTION	74	60/45	16	1	15	1180	18	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	BASAL BLAIRMORE	100	15/10	80	-	80	1100	88	GAS SOLD TO ALBERTA AND SOUTHERN GAS CO. LTD. AND WESTCOAST TRANSMISSION COMPANY LIMITED.
	CALGARY ELKTON	910	15/15	660	125	535	1120*	600	
	CROSSFIELD ELKTON	1200	10/10	1000	93	907	1120*	1016	
	WABAMUN	1700	15/50	740	44	696	1120*	780	
CROSSFIELD EAST	BLAIRMORE	1	15/10	1	-	1	1000	1	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	MISSISSIPPIAN	130	10/15	100	8	92	1120	103	
	WABAMUN	1400	10/60	510	-	510	1060	540	
DONALDA	VIKING	40	20/5	30	-	30	970	29	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	BASAL BLAIRMORE	5	15/5	4	-	4	970	4	
	DETRITAL	5	20/5	4	-	4	990	4	
DOWLING LAKE	BASAL BLAIRMORE	5	20/5	4	1	3	1030*	3	SUPPLIES LOCAL UTILITY.
DRUMHELLER	VIKING	4	25/5	3	-	3	1080	3	
	BLAIRMORE	48	10/5	41	-	41	1080	44	
	MISSISSIPPIAN	2	10/10	2	-	2	1080	2	

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30, 1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30, 1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU.FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
DUHAMEL	VIKING	5	10/5	4	-	4	1000	4	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	BLAIRMORE	4	10/5	3	-	3	1030	3	
	DEVONIAN ASSOC.	2	10/10	2	-	2	1100	2	
	DEVONIAN SOLUTION	12	40/45	4	-	4	1100	4	
DUNVEGAN	CADOTTE	10	25/5	7	-	7	1010	7	
	MISSISSIPPIAN	4	10/5	3	-	3	1040	3	
DUVERNAY	VIKING	4	20/5	3	2	1	1000*	1	GAS SOLD TO WESTERN MINERALS LTD. PLANT AND SUPPLIES LOCAL UTILITY.
DYBERG	BELLY RIVER	2	20/5	2	-	2	950	2	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	VIKING	8	10/5	7	-	7	1000	7	
	BASAL BLAIRMORE	12	10/5	10	-	10	1020	10	
EAGLESHAM	GETHING	6	15/5	5	-	5	1000	5	
	CADOMIN	6	15/5	5	-	5	1060	5	
	MISSISSIPPIAN	62	15/5	50	-	50	1110	56	
EDSON	GETHING	92	15/10	70	-	70	1050	74	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	MISSISSIPPIAN	2400	15/15	1700	24	1676	1030	1730	
EDWAND	MANNVILLE	4	20/5	3	-	3	1000	3	SUPPLIES LOCAL UTILITY.
ELK POINT	MANNVILLE	3	20/5	2	1	1	990*	1	SUPPLIES LOCAL UTILITY.
ELLERSLIE	BLAIRMORE	3	20/5	2	1	1	1000	1	GAS SOLD TO EDMONTON LIQUID GAS LTD.
ENCHANT	MILK RIVER	5	30/5	3	-	3	1030	3	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	BOW ISLAND	25	25/5	18	2	16	960*	15	
	BASAL COLORADO	1	25/5	1	-	1	1000	1	
	BASAL BLAIRMORE	12	15/10	10	2	8	1040*	8	
	ELLIS	3	25/10	2	-	2	1030	2	
	MISSISSIPPIAN	5	15/10	4	1	3	1040*	3	
EQUITY	MANNVILLE	4	20/5	3	-	3	1000	3	
	MISSISSIPPIAN	30	15/10	20	-	20	1100	22	
ERSKINE	VIKING	4	20/5	3	-	3	1040	3	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED
	BLAIRMORE	24	20/10	17	1	16	1090	17	
	LEDUC ASSOC.	29	10/20	21	-	21	1070	22	
	LEDUC SOLUTION	18	35/75	3	-	3	1110	3	

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30, 1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30, 1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU. FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
Esther	Victoria	23	30/5	15	-	15	990	15	
	Banff	20	10/5	17	-	17	1000	17	
Etzikom	Bow Island	79	20/5	60	30	30	930	28	Gas sold to South Alberta Pipe Lines Ltd.
	Basal Blairmore	1	25/5	1	-	1	1010	1	
Excelsior	Viking	9	15/5	7	2	5	1000	5	Gas sold to Canadian Industrial Gas Limited and Plains-Western Gas & Electric Co. Ltd.
	Basal Blairmore	39	10/5	33	-	33	970	32	
Eyremore	Bow Island	15	30/5	10	-	10	960	10	Presently considered beyond economic reach.
Fairydell-Bon Accord	Viking	110	20/5	85	17	68	1020*	69	Gas sold to North-western Utilities, Limited.
	Basal Blairmore	22	20/5	17	2	15	990*	15	
Faust South	Gething	12	10/5	10	-	10	990	10	Presently considered beyond economic reach.
Fenn-Big Valley	Viking	20	20/5	15	5	10	1000*	10	Gas sold to North-western Utilities, Limited.
	Nisku Solution	150	45/35	53	7	46	1110	51	
	Leduc Assoc. & Solution	13	45/45	4	1	3	1110	3	
Ferrier	Cardium	22	20/10	16	-	16	1000	16	Includes area formerly known as Crimson Lake.
	Viking Solution	31	35/25	15	-	15	1100	17	
	Nordegg	4	25/5	3	-	3	1080	3	
	Mississippian	3	20/10	2	-	2	1100	2	
Figure Lake	Viking	4	25/5	3	-	3	960	3	
	Blairmore	13	20/5	10	-	10	1000	10	
	Nisku	25	15/5	20	-	20	1000	20	
Flatbush	Mannville	13	20/5	10	-	10	1000	10	Presently considered beyond economic reach.
Foremost	Bow Island	33	15/5	27	6	21	950	20	Gas sold to Canadian Western Natural Gas Company Limited.
Fort Kent	Blairmore	5	20/5	4	1	3	980	3	Supplies local utility.
Fox Creek	Viking	24	25/5	17	-	17	1160	20	Viking reserve extends into Fox Creek North and Fox Creek West Areas and the volumes are shown under the respective areas.
	Cadomin	1	15/5	1	-	1	1160	1	
	Triassic	5	15/10	4	-	4	1160	5	

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FIELD OR AREA	ZONE	INITIAL GAS IN PLACE BCF	LOSSES RESERVOIR/SURFACE PER CENT	INITIAL MARKETABLE GAS BCF	MARKETABLE GAS PRODUCED TO JUNE 30, 1966 BCF	REMAINING MARKETABLE GAS JUNE 30, 1966 BCF	ESTIMATED HEATING VALUE BTU/CU. FT.	REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	REMARKS
Fox Creek North	Viking	53	25/5	38	-	38	1160	44	
	Cadomin	10	15/5	8	-	8	1160	9	
Fox Creek West	Viking	20	25/5	14	-	14	1160	16	
	Gething	13	25/5	9	-	9	1020	9	
	Cadomin	5	15/5	4	-	4	1160	5	
Garrington	Viking Assoc. & Non-Assoc.	4	20/10	3	-	3	1130	3	
	Blairmore	12	15/10	9	-	9	1010	9	
	Mississippian	1	15/10	1	-	1	1020	1	
	Leduc	46	15/20	31	-	31	1020	32	
Ghost Pine	Viking	9	20/5	7	-	7	1020	7	
	Blairmore	94	15/10	72	-	72	1030	74	
	Blairmore Assoc.	17	20/5	13	-	13	1050	14	
	Mississippian	47	15/5	38	-	38	1070	41	
Gilby	Cardium	3	15/10	2	-	2	1000	2	
	Viking Assoc. & Non-Assoc.	4	20/5	3	-	3	1220	4	
	Viking Solution	17	40/40	6	-	6	1250	8	
	Blairmore	140	20/10	100	3	97	1090*	106	Gas sold to Trans-Canada Pipe Lines Limited.
	Blairmore Solution	20	40/40	7	-	7	1250	9	
	Blairmore-Jurassic	240	20/10	170	8	162	1090*	177	
	Jurassic Assoc. & Non-Assoc.	210	20/10	150	9	141	1090*	154	
	Jurassic Solution	43	50/40	13	-	13	1100	14	
	Pekisko	420	10/15	320	62	258	1090*	281	
	Banff Associated	4	20/15	3	-	3	1100	3	
	Wabamun	7	10/20	5	-	5	1170	6	
Glenevis	Mannville	15	15/5	12	-	12	1040	12	Presently considered beyond economic reach.
Glen Park	Basal Blairmore	7	15/10	5	1	4	1140	5	Gas sold to Northwestern Utilities, Limited.
	Leduc Solution	16	35/15	9	1	8	1250	10	
Gold Creek	Cadomin	10	15/15	7	-	7	1050	7	
	Wabamun	890	20/30	500	-	500	1050	525	
Golden Spike	Viking	8	20/5	6	1	5	1050	5	Gas injected into Leduc Zone.
	Blairmore	22	10/5	19	1	18	1050	19	
	Wabamun	26	10/15	20	7	13	1060	14	
	Nisku Assoc.	4	15/15	3	-	3	1220	4	
	Nisku Solution	6	35/20	3	1	2	1220	2	
	Leduc Solution	130	30/30	64	-22	86	1290	111	

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30, 1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30, 1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU.FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
Goodwin Lake	Mannville	1	25/10	1	-	1	1050	1	Presently considered beyond economic reach.
	Jurassic	20	15/10	15	-	15	1070	16	
Gordondale	Paddy	35	15/5	28	23	5	1000	5	Gas sold to Westcoast Transmission Company Limited.
	Gething	53	15/5	43	28	15	1020	15	
Greencourt	Jurassic-Detrital	65	15/10	50	-	50	1070	54	Presently considered beyond economic reach.
	Mississippian Assoc.	37	25/10	25	-	25	1130	28	
Hackett	Basal Blairmore	62	10/10	50	4	46	1100	51	Gas sold to Trans-Canada Pipe Lines Limited.
Hairy Hill	Viking	1	25/5	1	-	1	980	1	Gas sold to Western Minerals Ltd.
	Blairmore	23	10/5	20	9	11	1000*	11	
	Nisku	3	20/5	2	-	2	1000	2	
Hamelin Creek	Cadotte	3	20/5	2	-	2	1000	2	
	Gething	4	15/5	3	-	3	1010	3	Supplies local utility.
	Cadomin	21	15/5	17	5	12	1060	13	
	Triassic	2	25/5	1	-	1	1160	1	
Hamilton Lake	Viking Assoc. & Non-Assoc.	15	25/5	11	-	11	1040	11	Presently considered beyond economic reach.
	Mannville	5	15/5	4	-	4	1050	4	
Hanna	Viking	11	20/5	8	-	8	1040	8	
	Blairmore	2	15/5	2	-	2	1050	2	
	Mississippian	1	20/5	1	-	1	1080	1	
Harmattan East	Mississippian Associated	1200	10/15	900	-8	908	1080	980	Reservoir being cycled. Gas injected into gas cap.
	Mississippian Solution	170	25/25	97	8	89	1280	114	
Harmattan-Elkton	Mississippian	55	15/15	40	-	40	1040	42	
	Mississippian Associated	1200	10/15	900	-21	921	1080	995	Reservoir being cycled. Gas injected into gas cap.
	Mississippian Solution	180	25/30	96	21	75	1280	96	
	Leduc	500	15/60	170	-	170	1100	187	
Heart River	Cadotte	2	15/5	2	-	2	1000	2	Supplies local utility.
	Notikewin	2	10/5	2	-	2	1000	2	
Hercules	Viking	19	15/5	15	-	15	1050	16	
	Blairmore	29	10/5	25	-	25	960	24	
High Prairie	Cadotte	4	15/5	3	-	3	1000	3	
	Notikewin	7	15/5	6	-	6	1100	7	
	Gething	1	15/5	1	-	1	1000	1	

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30,1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30,1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU.FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
HOLBURN	CARDIUM	8	20/5	6	1	5	980	5	GAS INJECTED INTO GOLDEN SPIKE.
	BLAIRMORE	25	20/10	18	-	18	1120	20	
HOLMBERG	BLAIRMORE	25	15/5	20	-	20	1050	21	GAS SOLD TO BAROID OF CANADA, LTD. PLANT.
HOMEGLEN-RIMBEY	LEDUC ASSOC. & SOLUTION	1000	10/15	800	174	626	1070*	670	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED AND ALBERTA AND SOUTHERN GAS CO. LTD.
HUNTER VALLEY	MISSISSIPPIAN	78	15/25	50	-	50	1080	54	
HUSSAR	BELLY RIVER	3	25/5	2	1	1	1000	1	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	VIKING	68	20/5	52	6	46	1020*	47	
	BASAL COLORADO	56	25/5	40	11	29	1020*	30	
	BLAIRMORE	620	15/5	500	87	413	1050	434	
INLAND	VIKING	21	25/5	15	-	15	980	15	
INNISFAIL	MANNVILLE	1	20/5	1	-	1	1050	1	
	MISSISSIPPIAN	22	10/10	18	-	18	1080	19	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	WABAMUN	4	15/15	3	-	3	1170	4	
	LEDUC ASSOC.	17	10/35	10	-	10	1020	10	
	LEDUC SOLUTION	200	45/45	60	14	46	1130*	52	
JARROW	VIKING	4	25/5	3	-	3	1010	3	
	MANNVILLE	16	15/5	13	-	13	1030	13	
JARVIE	VIKING	10	25/5	7	-	7	1040	7	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	BLAIRMORE	10	15/5	8	-	8	1100	9	
JENNER	BOW ISLAND	4	25/5	3	-	3	990	3	
	BASAL COLORADO	7	20/5	5	-	5	1040	5	
	BLAIRMORE	29	20/5	22	-	22	1050	23	
	MISSISSIPPIAN	2	15/5	2	-	2	1000	2	
JOARCAM	VIKING ASSOC.	66	20/5	50	-	50	1040	52	
JOFFRE	VIKING	1	25/5	1	-	1	1000	1	
	BASAL BLAIRMORE	44	20/10	32	-	32	1020	33	
	LEDUC	3	15/10	2	-	2	1050	2	
JUDY CREEK	VIKING	13	20/5	10	-	10	1020	10	GAS SOLD TO NORTH-WESTERN UTILITIES, LIMITED.
	BEAVERHILL LAKE SOLUTION	820	55/35	240	11	229	1080	248	

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30, 1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30, 1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU. FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
JUDY CREEK SOUTH	MISSISSIPPIAN	12	10/10	10	-	10	1050	11	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
JUMPING POUND	MISSISSIPPIAN	760	15/15	550	232	318	1050	334	GAS SOLD TO CANADIAN WESTERN NATURAL GAS COMPANY LIMITED.
JUMPING POUND WEST	MISSISSIPPIAN	1100	20/20	700	-	700	1050	735	
KAYBOB	NOTIKEWIN	350	15/5	280	40	240	1100*	264	GAS SOLD TO ALBERTA AND SOUTHERN GAS CO. LTD.
	SPIRIT RIVER	9	15/5	7	-	7	1000	7	
	GETHING	16	15/5	13	-	13	1050	14	
	CADOMIN	120	15/5	100	-	100	1040	104	
	WINTERBURN	5	15/35	3	-	3	1070	3	
	BEAVERHILL LAKE ASSOC.	7	20/15	5	-	5	1070	5	
	BEAVERHILL LAKE SOLUTION	330	60/25	100	6	94	1140	107	
KAYBOB SOUTH	VIKING	21	20/5	16	-	16	1100	18	
	CADOMIN	79	20/5	60	-	60	1040	62	
	TRIASSIC	5	20/5	4	-	4	1160	5	
	TRIASSIC SOLUTION	99	30/25	52	-	52	1160	60	
	NISKU	20	20/5	15	-	15	1240	19	
	BEAVERHILL LAKE	170	10/30	110	-	110	1210	134	
KESSLER	VIKING	100	25/5	64	7	57	1020*	58	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	MANNVILLE	5	10/5	4	-	4	990	4	
KILLAM	VIKING	4	25/5	3	-	3	1040	3	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	BLAIRMORE	9	15/5	7	-	7	1000	7	
KNAPPEN	SUNBURST-ELLIS	18	20/10	13	-	13	1000	13	GAS SOLD TO CANADIAN-MONTANA GAS COMPANY LTD.
	MISSISSIPPIAN	8	15/10	6	-	6	1000	6	
KNELLER	BLAIRMORE	24	20/5	18	-	18	1100	20	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
KNOPCIK	DOE CREEK	17	25/5	12	-	12	1000	12	GAS SOLD TO NORTHLAND UTILITIES LIMITED
	PADDY	1	20/5	1	-	1	1020	1	
LAC LA BICHE	BLAIRMORE	6	20/5	5	1	4	1010	4	SUPPLIES LOCAL UTILITY.
LAMBERT CREEK	WABAMUN	15	25/10	10	-	10	1050	11	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30, 1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30, 1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU. FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
Leahurst	Blairmore	37	15/5	30	1	29	1160*	34	Supplies local utility.
Leduc-Woodbend	Cardium	12	20/5	9	-	9	1040	9	
	Viking	20	20/5	15	3	12	1070	13	Injected into Nisku and Leduc gas caps.
	Blairmore	77	15/5	62	19	43	1180	51	
	Wabamun	2	15/10	2	-	2	1050	2	
	Nisku Associated	37	10/15	28	-8	36	1180	42	
	Nisku Solution	180	25/30	92	68	24	1180	28	Gas sold to Northwestern Utilities, Limited.
	Leduc Associated	420	15/15	300	-14	314	1180	371	
	Leduc Solution	150	40/30	63	57	6	1180	7	
Legal	Blairmore	7	25/5	5	-	5	1030	5	Gas sold to Canadian Industrial Gas Limited.
Lindbergh	Viking	3	35/5	2	-	2	990*	2	
	Blairmore	20	20/5	15	5	10	1000*	10	Supplies salt plant.
Little Bow	Blairmore	20	20/5	15	-	15	1000	15	
Lloydminster	Blairmore	24	15/30	14	12	2	950	2	Supplies local utility.
Lone Pine Creek	Basal Blairmore	5	15/10	4	-	4	1020	4	
	Wabamun	190	20/20	120	-	120	1030	124	
	Nisku	5	15/25	3	-	3	1050	3	
	Leduc	59	15/20	40	-	40	1060	42	
Long Coulee	Mannville	18	20/5	14	-	14	1000	14	
Lookout Butte	Mississippian	500	15/5	400	-	400	1040	416	Reservoir being cycled.
Lovett River	Blairmore	12	10/5	10	-	10	1040	10	Presently considered beyond economic reach.
	Mississippian	86	10/10	70	-	70	1040	73	
Majeau Lake	Blairmore	3	20/5	2	-	2	1000	2	Presently considered beyond economic reach.
	Mississippian	12	10/10	10	-	10	1070	11	
Malmo	Viking	7	15/5	6	-	6	1000	6	
	Blairmore	7	15/10	5	-	5	1030	5	
	Devonian	69	20/20	44	-	44	1100	48	
Manyberries	Bow Island	34	20/5	26	21	5	940	5	Gas sold to Canadian-Montana Gas Company Ltd.
Marlboro	Leduc	63	15/25	40	-	40	1030	41	
Marsh Head Creek	Leduc	27	15/35	15	-	15	1050	16	Presently considered beyond economic reach.

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30, 1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30, 1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU.FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
Marten Hills	Pelican	2	35/5	1	-	1	990	1	
	Grand Rapids	8	35/5	5	-	5	990	5	
	Wabiskaw	630	25/5	450	-	450	990	446	
	Wabamun	240	25/5	240	-	240	1000	240	
Matziwin	Viking	11	15/5	9	-	9	1000	9	
	Blairmore	1	15/5	1	-	1	1010	1	
Mazeppa	Mississippian	20	10/15	15	-	15	1060	16	Presently considered beyond economic reach.
McLeod	Belly River	1	15/5	1	-	1	980	1	
	Cadomin	6	25/10	4	-	4	980	4	
	Jurassic	7	25/10	5	-	5	1010	5	
Medicine Hat	Medicine Hat	2400	20/5	1800	397	1403	970*	1361	Gas sold to Trans-Canada Pipe Lines Limited, Many Islands Pipe Lines Limited and supplies local utility.
	Bow Island	14	25/5	10	1	9	970	9	
	Ellis	25	15/5	20	1	19	1000	19	
Medicine River	Blairmore Assoc. and Non-Assoc.	170	20/5	130	-	130	1150	150	
	Blairmore Solution	36	40/45	12	-	12	1250	15	
	Jurassic Assoc. and Non-Assoc.	46	20/5	35	-	35	1020	36	
	Jurassic Solution	73	35/45	26	-	26	1100	29	
	Mississippian Assoc. and Non-Assoc.	20	15/10	15	-	15	1100	17	
	Mississippian Solution	30	40/45	10	-	10	1200	12	
	Leduc Associated	6	10/20	4	-	4	1000	4	
Millet	Blairmore	21	20/10	15	-	15	1020	15	Presently considered beyond economic reach.
Minnehik-Buck Lake	Blairmore	6	25/5	4	-	4	1000	4	Gas sold to Alberta and Southern Gas Co. Ltd.
	Mississippian	590	15/10	450	58	392	1130	443	
Mitsue	Gilwood Assoc.	3	10/25	2	-	2	1170	2	Presently considered beyond economic reach.
	Gilwood Solution	390	45/25	160	-	160	1170	187	
Moose Mountain	Mississippian	75	20/25	45	-	45	1000	45	Presently considered beyond economic reach.
Morinville	Viking	3	25/5	2	-	2	1000	2	Gas sold to Canadian Industrial Gas Limited and supplies local utility.
	Blairmore	137	20/10	99	39	60	1070	64	

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30, 1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30, 1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU.FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
MOUNTAIN PARK	TRIASSIC	29	10/5	25	-	25	1090	27	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
MURIEL LAKE	MANNVILLE	8	25/5	6	1	5	1000	5	SUPPLIES LOCAL UTILITY.
NEVIS	BLAIRMORE	65	15/10	50	-	50	1000	50	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	DEVONIAN	970	15/15	700	117	583	1000*	583	
NEW NORWAY	VIKING	3	20/5	2	-	2	1000	2	
	BLAIRMORE	11	10/5	9	-	9	1010	9	
NITON	MANNVILLE	21	15/5	17	-	17	1070	18	
NIPISI	GILWOOD SOLUTION	230	45/25	96	-	96	1150	110	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
NORDEGG	TRIASSIC	9	10/10	7	-	7	1000	7	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	MISSISSIPPIAN	25	10/10	20	-	20	1000	20	
NORMANDVILLE	PEACE RIVER	1	20/5	1	-	1	990	1	
	GETHING	15	15/5	12	-	12	980	12	
	TRIASSIC	4	15/5	3	-	3	1090	3	
	BELLOY	1	10/5	1	-	1	1060	1	
	MISSISSIPPIAN	31	15/5	25	2	23	1050	24	SUPPLIES LOCAL UTILITY.
OBED	MISSISSIPPIAN	4	15/10	3	-	3	1050	3	
	NISKU	110	15/35	60	-	60	1060	64	
OBERLIN	BLAIRMORE	3	20/5	2	2	<1	1090*	<1	SUPPLIES LOCAL UTILITY.
OKOTOKS	WABAMUN	420	10/60	150	33	117	1000	117	GAS SOLD TO CANADIAN WESTERN NATURAL GAS COMPANY LIMITED.
OLDS	WABAMUN	370	15/20	250	17	233	1050	245	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
OYEN	VIKING	43	15/5	35	6	29	980*	28	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	DETRITAL	11	15/5	9	1	8	1010*	8	
PADDLE RIVER	JURASSIC	220	35/10	130	-	130	1070	139	GAS SOLD TO NORTH-WESTERN UTILITIES, LIMITED.
	MISSISSIPPIAN	30	25/10	20	-	20	1060	21	
PAKOWKI LAKE	BOW ISLAND	15	25/5	10	6	4	940	4	GAS SOLD TO CANADIAN-MONTANA GAS COMPANY LTD.

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30, 1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30, 1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU. FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
Parflesh	Viking	3	20/5	2	-	2	1000	2	
	Mannville	10	15/5	8	-	8	1000	8	
Parkland North-east	Mississippian	21	15/15	15	-	15	1010	15	Presently considered beyond economic reach.
Pembina	Belly River Assoc. and Non-Assoc.	79	20/5	60	1	59	1180	70	Gas sold to North-western Utilities, Limited
	Belly River Solution	100	55/80	9	2	7	1180	8	
	Cardium Solution	4300	35/40	900	146	754	1170	882	
	Viking	11	20/5	8	-	8	1100	9	
	Blairmore	260	15/10	200	19	181	1120	203	
	Jurassic	19	15/5	15	-	15	1050	16	
	Mississippian	15	15/15	11	-	11	1050	12	
Pendant D'Oreille	Bow Island	170	15/5	140	85	55	940	52	Gas sold to Canadian-Montana Gas Company Ltd.
	Mannville	66	20/5	50	12	38	1000	38	
Penhold	Viking	14	10/5	12	-	12	1020	12	Presently considered beyond economic reach.
Phil Can	Gething	11	20/5	8	-	8	980	8	Presently considered beyond economic reach.
	Mississippian	5	15/5	4	-	4	1050	4	
Pincher Creek	Mississippian	1100	35/25	540	240	300	1020*	306	Gas sold to Trans-Canada Pipe Lines Limited.
Pine Creek	Wabamun	210	15/50	90	5	85	1050*	89	Gas used to maintain pressure in Windfall Field.
	Leduc	770	60/35	200	112	88	1050*	93	
Pine North-west	Leduc	190	15/25	120	-	120	1050	126	
Plain Lake	Viking	3	25/5	2	-	2	980	2	Presently considered beyond economic reach.
	Blairmore	28	20/5	21	-	21	1000	21	
Plover Lake	Viking	19	15/5	15	-	15	1000	15	Presently considered beyond economic reach.
Pouce Coupe	Peace River	190	35/5	120	76	44	1000	44	Gas sold to Westcoast Transmission Company Limited.
	Cadomin	4	15/5	3	-	3	1060	3	

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30,1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30,1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU.FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
POUCE COUPE SOUTH	DOE CREEK	4	40/5	2	1	1	1000	1	GAS SOLD TO WESTCOAST TRANSMISSION COMPANY LIMITED AND PEACE RIVER TRANSMISSION COMPANY LIMITED.
	PEACE RIVER	98	30/5	65	45	20	1040	21	
	GETHING	25	40/5	14	10	4	1000	4	
	CADOMIN	2	15/5	2	2	< 1	1000	< 1	
	TRIASSIC	11	20/5	8	-	8	1000	8	
PREVO	MANNVILLE	5	15/10	4	-	4	1020	4	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	MISSISSIPPIAN	44	15/10	34	5	29	1110*	32	
PRINCESS	SECOND WHITE SPECKS	60	30/5	40	2	38	970*	37	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	BOW ISLAND	1	25/5	1	-	1	1010	1	
	BASAL COLORADO	20	20/5	15	1	14	1020*	14	
	MANNVILLE	110	20/5	81	18	63	1020*	64	
	JEFFERSON	31	15/5	25	1	24	1030*	25	
PROVOST	VIKING	820	20/5	620	175	445	1030*	458	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED AND SUPPLIES LOCAL UTILITY.
	BLAIRMORE	19	15/5	15	-	15	1000	15	
REDLAND	BELLY RIVER	2	35/5	1	-	1	1000	1	
	VIKING	3	20/5	2	-	2	1000	2	GAS SOLD TO CANADIAN WESTERN NATURAL GAS COMPANY LIMITED.
	BLAIRMORE	19	15/5	15	1	14	1050	15	
REDWATER	VIKING	14	25/5	10	1	9	1040	9	SUPPLIES LOCAL UTILITY AND GAS SOLD TO CANADIAN INDUSTRIAL GAS & OIL LTD.
	LEDUC SOLUTION	200	40/65	42	9	33	1220	40	
RED WILLOW	VIKING	13	20/5	10	-	10	1020	10	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	BLAIRMORE	13	20/10	9	-	9	1100	10	
RETLAW	BOW ISLAND	3	25/5	2	-	2	950	2	
	BASAL COLORADO	8	25/5	6	-	6	1020	6	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	BLAIRMORE	56	20/10	40	2	38	1000	38	
RICH	BLAIRMORE	16	15/10	12	-	12	1100	13	
RICHDALE	VIKING	14	25/5	10	-	10	1010	10	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	BLAIRMORE	11	25/5	8	-	8	1050	8	

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30, 1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30, 1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU.FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
Rochester	Viking	5	20/5	4	-	4	1000	4	
	Blairmore	27	25/5	19	-	19	1000	19	
	Wabamun	6	10/5	5	-	5	1070	5	
Rowley	Basal Belly River	5	20/5	4	-	4	1000	4	
	Viking	9	10/5	8	-	8	1040	8	
	Mannville	20	15/5	16	-	16	1070	17	
	Mississippian Assoc. and Non-Assoc.	47	10/10	38	-	38	1080	41	
Rycroft	Gething	16	15/5	13	3	10	1040	10	Supplies local utility.
St. Albert-Big Lake	Viking	3	20/5	2	-	2	1070*	2	Gas sold to Canadian Industrial Gas Limited.
	Blairmore	150	15/5	120	55	65	1070*	70	
St. Paul	Blairmore	4	20/5	3	3	<1	1000*	<1	Supplies local utility.
Saddle Hills	Peace River	48	30/5	32	-	32	1020	33	
	Gething	5	20/5	4	-	4	980	4	
	Permo-Penn	22	20/15	15	-	15	1030	15	
Samson	Blairmore Assoc. and Solution	12	30/5	8	4	4	1040	4	Gas sold to North-western Utilities, Limited.
Sarcee	Mississippian	210	15/15	150	27	123	1050	129	Gas sold to Canadian Western Natural Gas Company Limited
Savanna Creek	Mississippian	590	10/25	400	20	380	1020	388	Gas sold to Westcoast Transmission Company Limited.
Sedalia	Viking	130	25/5	100	4	96	1010*	97	Gas sold to Trans-Canada Pipe Lines Limited.
	Blairmore	1	25/5	1	-	1	1010	1	
Seiu Lake	Viking	1	25/5	1	-	1	1000	1	
	Mannville	17	15/5	14	-	14	1000	14	
Sibbald	Viking	33	20/5	25	10	15	960*	14	Gas sold to Trans-Canada Pipe Lines Limited.
	Basal Colorado	13	20/5	10	-	10	970	10	
	Banff	1	20/5	1	-	1	1050	1	
Simonette	Cadomin	13	15/10	10	-	10	1060	11	
	Wabamun	60	15/35	33	-	33	1070	35	
	Leduc Solution	270	45/40	89	-	89	1020	91	

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30,1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30,1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU.FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
SMITH COULEE	BOW ISLAND	83	25/5	59	18	41	930	38	GAS SOLD TO CANADIAN-MONTANA GAS COMPANY LTD.
STANDARD	VIKING	26	20/5	20	-	20	1000	20	
STEEN	SLAVE POINT	14	10/15	11	-	11	1070	12	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	ELK POINT	5	20/20	3	-	3	1100	3	
STEEP CREEK	GETHING	6	15/5	5	-	5	1020	5	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	TRIASSIC	9	15/10	7	-	7	1030	7	
	PERMO-PENN	14	10/10	12	-	12	1030	12	
STETTLER	VIKING	4	25/5	3	-	3	1020	3	
	NISKU SOLUTION	20	45/45	6	2	4	1130	5	GAS SOLD TO NORTH-WESTERN UTILITIES, LIMITED.
	LEDUC SOLUTION	13	45/45	4	1	3	1140	3	
STOLBERG	MISSISSIPPIAN	87	10/10	70	-	70	1040	73	
STRATHMORE	BELLY RIVER	14	20/5	11	1	10	1000	10	GAS SOLD TO CANADIAN WESTERN NATURAL GAS COMPANY LIMITED.
	VIKING	9	20/5	7	-	7	1000	7	
	MISSISSIPPIAN	1	20/5	1	-	1	1000	1	
STURGEON LAKE	GETHING	12	15/5	10	-	10	1000	10	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	GILWOOD	3	25/5	2	-	2	1100	2	
STURGEON LAKE SOUTH	GETHING	16	15/5	13	-	13	1000	13	
	CADOMIN	6	15/5	5	-	5	1060	5	
	TRIASSIC ASSOCIATED	5	10/5	4	-	4	1180	5	
	TRIASSIC SOLUTION	15	35/70	3	-	3	1180	4	
	WABAMUN	7	10/25	5	-	5	1070	5	
	LEDUC ASSOCIATED	7	10/25	5	-	5	1080	5	
	LEDUC SOLUTION	270	45/45	83	11	72	1080	78	GAS SOLD TO CANADIAN UTILITIES LIMITED.
STURGEON LAKE SOUTH GENERAL AREA	GETHING	84	15/5	68	-	68	1000	68	
	CADOMIN	31	15/5	25	-	25	1060	27	
	TRIASSIC	6	15/5	5	-	5	1180	6	
	PERMO-PENN	3	20/5	2	-	2	1030	2	
SUNDRE	VIKING	7	20/10	5	-	5	1020	5	
	BLAIRMORE	16	15/10	12	-	12	1020	12	
	ELKTON ASSOCIATED	21	15/15	15	-4	19	1070	20	
	ELKTON SOLUTION	68	50/35	22	4	18	1100	20	GAS INJECTED INTO GAS CAP.

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30, 1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30, 1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU.FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
Sunnynook	Viking	3	25/5	2	-	2	1010	2	
	Blairmore	25	15/5	20	-	20	1030	21	
Swalwell	Viking	4	20/5	3	-	3	1000	3	
	Mississippian	43	15/5	35	-	35	1100	39	
Swan Hills	Gething	1	10/5	1	-	1	1050	1	
	Beaverhill Lake Solution	1300	55/60	240	9	231	1120	259	Gas sold to Northwestern Utilities, Limited.
Swan Hills South	Beaverhill Lake Solution	570	55/40	150	6	144	1120	161	Gas sold to Northwestern Utilities, Limited.
Sylvan Lake	Viking	4	15/5	3	-	3	1010	3	
	Blairmore	350	15/10	270	15	255	1100	280	Gas sold to Trans-Canada Pipe Lines Limited.
	Detrital	8	20/10	6	-	6	1100	7	
	Jurassic Assoc. and Non-Assoc.	62	20/10	45	-	45	1020	46	
	Jurassic Solution	24	40/45	8	-	8	1100	9	
	Mississippian	170	20/10	120	3	117	1100	129	
	Mississippian Solution	42	40/40	15	-	15	1200	18	
	Leduc Associated	35	20/10	25	1	24	1020	25	
	Leduc Solution	14	35/45	5	-	5	1100	6	
Taber South	Bow Island	17	30/5	11	-	11	1000	11	
Tangent	Cadotte	14	30/5	9	-	9	1010	9	
	Gething	79	20/5	60	-	60	1000	60	
	Triassic	53	20/5	40	-	40	1180	47	
Telfordville	Mississippian	12	15/10	9	-	9	1110	10	
	Wabamun	10	15/5	8	-	8	1090	9	
Thorhild	Mannville	12	15/5	10	-	10	1000	10	Now includes area formerly known as Tawatinaw.
Three Hills Creek	Belly River	9	15/5	7	-	7	970	7	
	Viking	8	20/5	6	-	6	1000	6	
	Mississippian	210	10/10	170	14	156	1110*	173	Gas sold to Trans-Canada Pipe Lines Limited.
	Leduc	10	20/15	7	-	7	1100	8	

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30, 1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30, 1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU.FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
Turin	Bow Island	13	20/5	10	-	10	970	10	Presently considered beyond economic reach.
	Blairmore	35	10/5	30	-	30	1020	31	
	Ellis	5	15/5	4	-	4	1070	4	
	Mississippian	4	15/10	3	-	3	1050	3	
Turner Valley	Mississippian Associated	1500	10/70	410	281	129	1110	143	Gas sold to Canadian Western Natural Gas Company Limited and supplies local utility.
	Mississippian Solution	1400	45/55	350	275	75	1110	83	
Tuttle	Mannville	4	10/5	3	-	3	1000	3	Gas sold to Canadian Western Natural Gas Company Limited.
Tweedie	Viking	11	25/5	8	-	8	1000	8	Contains portion of area formerly known as Lac La Biche.
	Blairmore	14	25/5	10	-	10	1040	10	
Twining North	Mannville	7	20/5	5	-	5	1100	6	
	Mississippian Associated	40	20/5	30	-	30	1110	33	
	Mississippian Solution	16	40/15	8	-	8	1110	9	
Two Creek	Triassic	12	10/5	10	-	10	1090	11	Presently considered beyond economic reach.
Usona	Blairmore	12	10/5	10	-	10	1110	11	Presently considered beyond economic reach.
Verger	Bow Island	3	25/5	2	-	2	1100	2	Gas sold to Trans-Canada Pipe Lines Limited.
	Basal Colorado	7	25/5	5	1	4	1060	4	
	Mannville	74	15/5	60	2	58	1050	61	
	Mississippian	3	15/10	2	-	2	1070	2	
Viking-Kinsella	Viking	950	15/5	770	399	371	1000*	371	Gas sold to Northwestern Utilities, Limited and supplies local utility.
	Blairmore	79	20/5	60	14	46	1000	46	
	Devonian	18	20/5	14	4	10	990*	10	
Virginia Hills	Blairmore	9	10/5	8	-	8	1040	8	Gas sold to Northwestern Utilities, Limited.
	Permian	20	15/10	15	-	15	1160	17	
	Beaverhill Lake Solution	230	60/60	36	3	33	1070	35	
	Slave Point	3	25/20	2	-	2	1070	2	
Vulcan	Mannville	26	20/5	20	-	20	1000	20	
	Mississippian	23	20/20	15	-	15	1010	15	

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30, 1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30, 1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU. FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
WAINWRIGHT	VIKING	5	15/5	4	-	4	980	4	
	BLAIRMORE ASSOC. AND NON-ASSOC.	36	20/30	20	-	20	940	19	
WASKAHIGAN	DUNVEGAN	66	20/5	50	-	50	1100	55	
WATERTON	MISSISSIPPIAN	2200	15/40	1100	102	998	1040*	1038	GAS SOLD TO ALBERTA AND SOUTHERN GAS CO. LTD.
	DEVONIAN	270	20/30	150	19	131	1020	134	
WATTS	VIKING	3	20/5	2	1	1	1030*	1	SUPPLIES LOCAL UTI-- LITY.
	MISSISSIPPIAN	1	20/5	1	-	1	1070	1	
WAYNE-ROSEDALE	BELLY RIVER	7	20/5	5	-	5	1000	5	GAS SOLD TO TRANS-CANADA PIPE LINES LINES LIMITED, CANADIAN WESTERN NATURAL GAS COMPANY LIMITED AND SUPPLIES LOCAL UTILITY.
	VIKING	220	15/5	180	17	163	1090*	178	
	BLAIRMORE	220	15/5	180	23	157	1120	176	
WEST DRUMHELLER	BASAL BLAIRMORE	7	15/5	6	-	6	1100	7	
	NISKU ASSOCIATED	9	10/15	7	-	7	1090	8	
WESTEROSE	VIKING	3	20/5	2	-	2	1000	2	
	BLAIRMORE	7	20/5	5	-	5	1020	5	
	LEDUC ASSOCIATED	130	10/20	90	-9	99	1070	106	GAS INJECTED INTO GAS CAP.
	LEDUC SOLUTION	140	35/15	79	9	70	1100	77	
WESTEROSE SOUTH	WABAMUN	7	10/10	6	-	6	1090	7	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED AND ALBERTA AND SOUTHERN GAS CO. LTD.
	LEDUC	1700	10/15	1300	269	1031	1070*	1104	
WESTLOCK	VIKING	310	15/5	250	28	222	1060*	236	GAS SOLD TO CANADIAN INDUSTRIAL GAS LIMITED AND SUPPLIES LOCAL UTILITY.
	BLAIRMORE	4	20/5	3	-	3	1100	3	
WEST PRAIRIE	CADOTTE	18	10/5	15	-	15	1040	16	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	BLUESKY	6	10/5	5	-	5	990	5	
WHITELAW	GETHING	31	15/5	25	5	20	1020	20	SUPPLIES LOCAL UTILITY.
	TRIASSIC	33	20/5	25	-	25	1090	27	
WILDCAT HILLS	MISSISSIPPIAN	810	15/20	550	67	483	1050*	508	GAS SOLD TO ALBERTA AND SOUTHERN GAS CO. LTD.

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30, 1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30, 1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU.FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
WILDHORSE CREEK	MISSISSIPPIAN	150	15/20	100	-	100	940	94	
WILDMERE	BLAIRMORE	37	20/5	28	9	19	960*	18	GAS SOLD TO NORTH-WESTERN UTILITIES, LIMITED.
WILDUNN CREEK	VIKING	35	25/5	25	2	23	1010	23	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED
WILLESDEN GREEN	BELLY RIVER	14	20/5	10	-	10	1000	10	GAS SOLD TO ALBERTA AND SOUTHERN GAS CO. LTD.
	CARDIUM	12	20/5	9	-	9	1100	10	
	CARDIUM SOLUTION	290	65/35	68	1	67	1100	74	
	BASAL BLAIRMORE	36	15/15	26	-	26	1100	29	
	MISSISSIPPIAN	3	20/5	2	-	2	1100	2	
WILLINGDON	VIKING	3	25/5	2	-	2	980	2	GAS SOLD TO WESTERN MINERALS LTD. AND SUPPLIES LOCAL UTILITY.
	MANNVILLE	15	25/5	11	2	9	990	9	
	LEDUC	11	10/5	9	6	3	1000*	3	
WILSON CREEK	PEKISKO	46	10/5	39	-	39	1090	43	
	BANFF	12	10/5	10	-	10	1080	11	
WIMBORNE	VIKING	1	25/5	1	-	1	1020	1	
	MISSISSIPPIAN	1	10/10	1	-	1	1100	1	
	NISKU	3	20/15	2	-	2	1160	2	
	NISKU SOLUTION	5	30/45	2	-	2	1160	2	
	LEDUC ASSOCIATED	320	10/30	200	14	186	1000	186	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	LEDUC SOLUTION	110	50/45	30	1	29	1000	29	
WINDFALL	VIKING	17	25/5	12	-	12	1030	12	RESERVOIR BEING CYCLED. GAS SOLD TO ALBERTA AND SOUTHERN GAS CO. LTD, PRESSURE MAINTAINED BY PINE CREEK GAS.
	MISSISSIPPIAN	5	15/5	4	2	2	1040	2	
	LEDUC	820	20/30	460	33	427	1080*	461	
WINNIFRED	BOW ISLAND	16	20/5	12	-	12	1000	12	
WINTERING HILLS	BELLY RIVER	1	25/5	1	-	1	1000	1	INCLUDES AREAS FORMERLY KNOWN AS HUTTON AND PLUMBRIDGE.
	VIKING	38	20/5	29	-	29	1010	29	
	BLAIRMORE	49	25/10	33	-	33	1070	35	
	MISSISSIPPIAN	1	25/10	1	-	1	1030	1	

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO JUNE 30, 1966 BCF	(7) REMAINING MARKETABLE GAS JUNE 30, 1966 BCF	(8) ESTIMATED HEATING VALUE BTU/CU.FT.	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS BCF	(10) REMARKS
Wizard Lake	Belly River	1	25/5	1	-	1	1050	1	
	Viking Assoc. and Non-Assoc.	1	15/10	1	-	1	1070	1	
	Blairmore	15	20/15	10	10	<1	1120	<1	Gas sold to North-western Utilities, Limited.
	Leduc Solution	230	40/25	110	16	94	1250	117	
Woking	Peace River	5	10/5	4	-	4	1040	4	Supplies local utility.
	Spirit River	3	20/5	2	-	2	1040	2	
	Bluesky	4	20/5	3	-	3	1040	3	
	Permo-Penn	3	20/5	2	-	2	1060	2	
	Mississippian	3	25/5	2	-	2	1070	2	
Wolf Lake	Cadomin	13	10/5	11	-	11	1060	12	Presently considered beyond economic reach.
Wood River	Blairmore	42	10/10	34	6	28	1090	31	Gas sold to Trans-Canada Pipe Lines Limited.
Worsley	Leduc	300	20/5	230	44	186	1070	199	Gas sold to Westcoast Transmission Company Limited and supplies local utility.
Zama Lake	Elk Point	16	20/5	12	-	12	1110	13	Presently considered beyond economic reach.
	SUB TOTAL			42,545	5,849	36,696		38,959	
	OTHER RESERVES								
	Less than 10 Bcf			852	-	852	-	906	
	Confidential Pools			165	-	165	-	185	
	TOTAL RESERVES, JUNE 30, 1966			43,562	5,849	37,713		40,050	
	TOTAL RESERVES WITHIN ECONOMIC REACH			41,348	5,849	35,499		37,696	
	TOTAL RESERVES BEYOND ECONOMIC REACH			2,214	-	2,214		2,354	

* MEASURED HIGHER HEATING VALUE

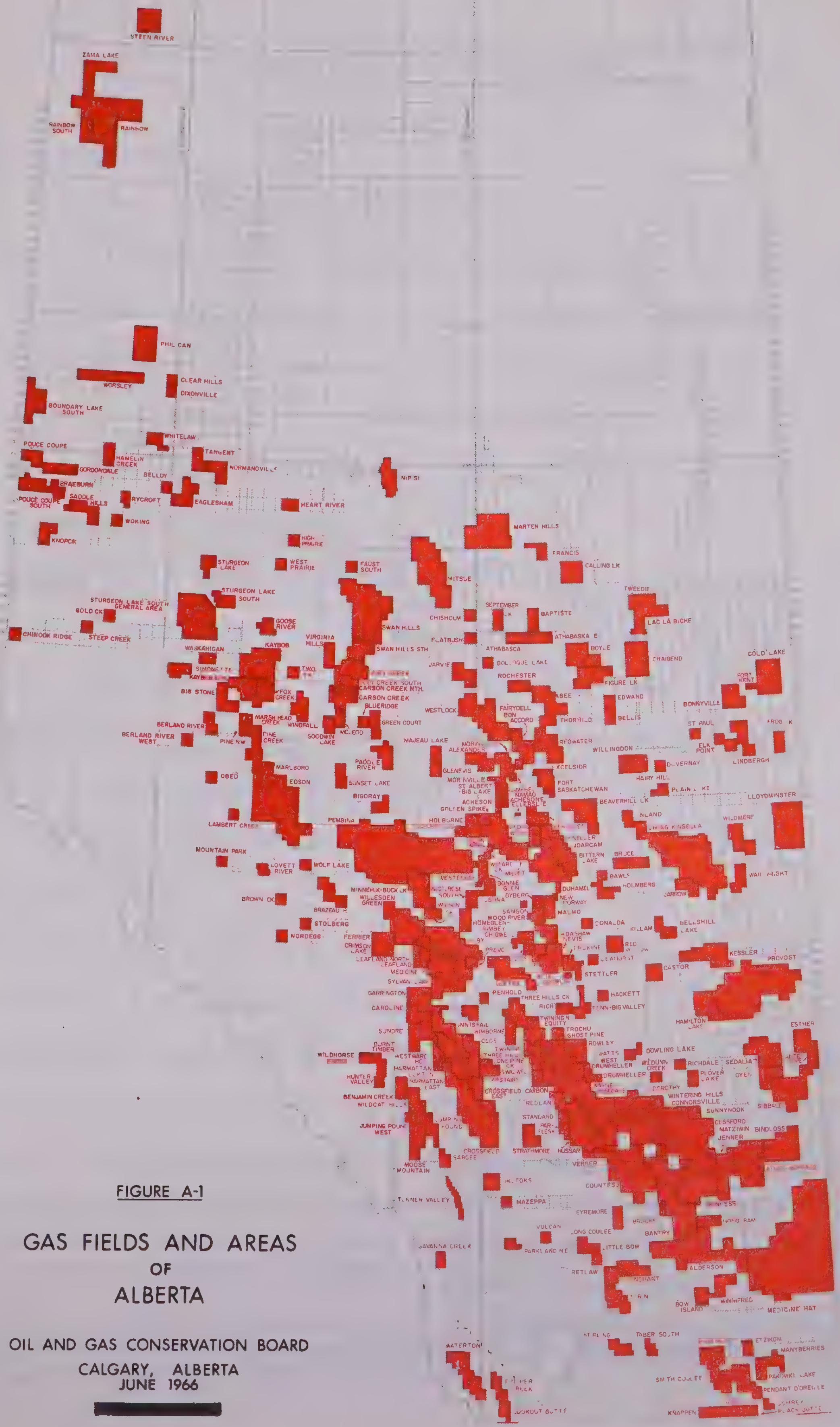

FIGURE A-1

GAS FIELDS AND AREAS
OF
ALBERTA

OIL AND GAS CONSERVATION BOARD
CALGARY, ALBERTA
JUNE 1966

APPENDIX B

THE TRENDS IN EXPLORATION FOR AND THE GROWTH OF RESERVES OF GAS IN ALBERTA

Growth of Reserves

(1) Views of Alberta and Southern

Alberta and Southern did not present a study of the trends in the growth of gas reserves in the Province. However, in commenting on the contractable surplus, it submitted that it anticipated the usual over-all increase of remaining established reserves as a result of discoveries and appreciation of known reserves.

(2) Views of the Board

The Board, in OGCB Report 66-18(1) reviewed in detail the long term trend in the growth of initial gas reserves in Alberta as of December 31, 1965, and concluded that the long term rate of growth was still averaging the 2.5 trillion cubic feet per year previously interpreted. The annual rate of growth over the two-year period ending December 31, 1965, was shown to average 3.1 trillion cubic feet.

The Board continues to interpret the long term growth rate as averaging 2.5 trillion cubic feet per year.

As shown in Appendix A of this report, the Board estimates the initial marketable gas reserves in the Province as of June 30, 1966, to be some 43.5 trillion cubic feet. In OGCB Report 64-11(2) the Board estimated the initial marketable gas reserves of the Province as of June 30, 1964, to be 39.8 trillion cubic feet. This shows that the reserves have grown by 3.7 trillion cubic feet over the past 24 months or at a rate of some 1.85 trillion cubic feet per year.

---

(1) Reserves of Crude Oil, Gas, Natural Gas Liquids and Sulphur. Province of Alberta. December 31, 1965.

(2) Report on the Applications of Trans-Canada Pipe Lines Limited and Alberta and Southern Gas Co. Ltd. under The Gas Resources Preservation Act, 1956. November, 1964.

Although the appreciation of previous discoveries has generally been normal, the reduction in the estimates of reserves of the Pincher Creek and Pine Creek Fields and relatively modest discoveries, based on present knowledge, experienced during the period has resulted in the lower than average growth rate for the two year period immediately preceding June 30, 1966.

The Board believes that the lower growth rate experienced over the past two years, relative to that of the two-year period ending December 31, 1965, referred to previously, and the long term average growth rate, is merely a low growth period in the sequence of periods of above average and below average growth. When all data are taken together, the pattern of reserve growth is expected to continue at a rate much closer to the long term growth rate of about 2.5 trillion cubic feet per year.

Ultimate Reserves

Alberta and Southern did not submit evidence respecting the ultimate reserves in the Province.

The Board, for the reasons presented in OGCB Report 66-18 and OGCB Report 66-C(3), continues to believe that an ultimate gas reserve estimate for the Province of 100 trillion cubic feet is reasonable.

---

(3) Report on an Application of Trans-Canada Pipe Lines Limited under The Gas Resources Preservation Act, 1956. June, 1966.

APPENDIX C

ALBERTA GAS REQUIREMENTS AND PRESENT PERMIT COMMITMENTS

The applicant did not present its own forecast of Alberta's thirty-year requirements, but rather relied upon the Board's forecast published in OGCB Report 66-C.(1) The Utility Companies stated that they saw no need to revise their forecast presented to the Board early in 1966, which was reviewed and summarized in report 66-C.

In view of the fact that no further evidence has been presented with respect to Alberta's requirements, and the short period of time since the Board's last assessment, the Board has revised its forecast of Alberta requirements for the period January 1, 1966, to December 31, 1995, shown in OGCB Report 66-C, only to reflect additional amounts of 'other' industrial requirements of some 125 billion cubic feet. This amount comprises gas shrinkage at the Empress gas processing plant and fuel requirements for Alberta Gas Trunk Line relating to the approval of Trans-Canada's last application, and a minor revision to the Board's previous estimates.

To conform with the date of reserve assessment in this report, the Board has decided to relate the requirements and permit commitments to the thirty-year period July 1, 1966, to June 30, 1996. Accordingly, the Board's forecast published in OGCB Report 66-C, with the addition of the amount of other industrial consumption referred to above, has been adjusted by the deduction of actual Alberta requirements for the period January 1 to June 30, 1966, and the addition of estimated Alberta requirements for the period January 1, 1996, to June 30, 1996. The Board therefore estimates Alberta requirements for the thirty-year period July 1, 1966, to June 30, 1996, to total some 12,152 billion cubic feet. The calculation is as follows:

---

(1) Report on an Application of Trans-Canada Pipe Lines Limited under The Gas Resources Preservation Act, 1956. June, 1966.

		Bcf
Alberta Requirements January 1, 1966, to December 30, 1995 (including 125 Bcf of additional other industrial requirements)		11,975
Less Actual Requirements January 1, 1966, to June 30, 1966	(113)	
Plus Estimated Requirements January 1, 1996, to June 30, 1996	290	
		177
Alberta Requirements July 1, 1966, to June 30, 1996		12,152

Table C-1 is a reproduction of Table C-5 in OGCB Report 66-C, after adjustment for the amount of other industrial requirements referred to above. It summarizes the Board 1964, Utility Companies 1966 and current Board Staff and Board forecasts, relating to the period January 1, 1966, to December 31, 1995. Additional amounts of 'other' industrial consumption contingent upon the approval of Alberta and Southern's present application are relatively insignificant and therefore have not been provided for in this Appendix.

Permit Commitments

The present permit commitments, the volume of gas removed to June 30, 1966, and the maximum daily authorized withdrawal rates, under authority of each of the 29 permits issued, are shown in Table C-2. At June 30, 1966, initial permit volumes totalled some 24.6 trillion cubic feet of gas. At this date, approximately 3.4 trillion cubic feet or 14 per cent had been removed from the Province.

The principal adjustment in the permit commitments from the levels shown in Table C-6 of OGCB Report 66-C relates to the Trans-Canada permit issued on June 29, 1966.

TABLE C-1

SUMMARY OF FORECASTS OF ALBERTA GAS REQUIREMENTS FOR PERIOD JANUARY 1, 1966, TO DECEMBER 31, 1995

(Billions of Cubic Feet of 1000 Btu Gas)

	Board 1964	Utility Companies 1966*	Board Staff 1966	Board 1966
Domestic				
1966 Annual	50.8	50.7	50.0	50.0
1995 Annual	119.6	108.0	117.4	117.4
30-Year Total	2,416	2,330	2,445	2,445
Commercial				
1966 Annual	34.1	39.3	38.8	39.1
1995 Annual	76.1	86.8	97.8	92.3
30-Year Total	1,574	1,864	1,987	1,925
Industrial				
1966 Annual	116.3	117.2	120.6	120.6
1995 Annual	371.5	425.6	349.4	349.4
30-Year Total	7,092	8,361	7,605	7,605
Total				
1966 Annual	201.2	207.7	209.4	209.7
1995 Annual	567.2	623.9	564.6	559.1
30-Year Total	11,082	12,680	12,037	11,975
Equivalent Average Annual Growth Rate to Achieve Terminal Year (%)	3.6	3.9	3.5	3.4
Equivalent Average Annual Growth Rate to Achieve 30-Year Total (%)	3.9	4.5	4.1	4.1

*Industrial and Total numbers adjusted to include Board's revised estimate of 'other' industrial consumption.

TABLE C-2

PERMIT COMMITMENTS

(ALL VOLUMES AT 14.65 PSIA AND 60°F)

PERMIT NUMBER	PERMITTEE AND FIELDS UNDER PERMIT	PERMITTED WITHDRAWALS			WITHDRAWN TO JUNE 30, 1966 BCF	REMAINING AUTHORIZED WITHDRAWAL BCF
		MAXIMUM DAY MMCF	MAXIMUM ANNUAL BCF	TOTAL BCF		
AS 64-3	ALBERTA AND SOUTHERN GAS CO. LTD.					
	BERLAND RIVER, BIGSTONE, BRAZEAU RIVER, BURNT TIMBER, CAROLINE, CARSON CREEK, CARSON CREEK NORTH, CROSSFIELD (RUNDLE POOL), FERRIER (VIKING A AND CARDIUM B POOLS), FOX CREEK, FOX CREEK NORTH, FOX CREEK WEST, HARMATTAN-ELKTON (D-3 A POOL), HOMEGLEN-RIMBEY, HUNTER VALLEY, KAYBOB, LEAFLAND NORTH, MARLBORO, MINNEHIK-BUCK LAKE, PEMBINA (LOBSTICK GLAUCONITIC AND LOBSTICK OSTRACOD POOLS), PINE CREEK, PINE NORTH-WEST, SUNDRE, SYLVAN LAKE, WATERTON, WESTEROSE SOUTH, WESTWARD HO, WILDCAT HILLS, WILDHORSE CREEK, WILLESDEN GREEN, WILSON CREEK AND WINDFALL.	750.0	250.0	6450.0	689.9	5760.1
BH 61-1	DELTA GAS & TRANSMISSION LTD.					
BS 61-1	BAILEY SELBURN OIL AND GAS LTD.					
CS 61-1	THE CALIFORNIA STANDARD COMPANY					
COG 61-1	CHARTER OIL AND GAS LTD. — MEDICINE HAT	9.5	3.5	71.0	-	71.0
SEL 61-1	SELBAY EXPLORATION LTD.					
JMW 61-1	J. MERRIL WRIGHT, JR.					
CEL 61-1	CROWFOOT EXPLORATION LTD.					
CD 63-1	CANADIAN DELHI OIL LTD. - MEDICINE HAT	4.3	1.57	32.3	2.1	30.2
CM 54-1 AND CM 61-2	CANADIAN-MONTANA PIPE LINE COMPANY					
	ADEN, BLACK BUTTE, COMREY, KNAPPEN, MANYBERRIES, PAKOWKI LAKE, PENDANT D'OREILLE AND SMITH COULEE.	100.0	40.0	436 (1)	197.1	238.9
CP 63-1	CANADIAN PACIFIC OIL AND GAS LIMITED - MEDICINE HAT	0.1	0.0365	0.750	0.07	0.680

(1) TOTAL INITIAL MARKETABLE GAS IN THE FIELDS SHOWN

TABLE C-2 (CONTINUED)

PERMIT COMMITMENTS

(ALL VOLUMES AT 14.65 PSIA AND 60°F)

PERMIT NUMBER	PERMITTEE AND FIELDS UNDER PERMIT		PERMITTED WITHDRAWALS			WITHDRAWN TO JUNE 30, 1966 BCF	REMAINING AUTHORIZED WITHDRAWAL BCF
			MAXIMUM DAY MMCF	MAXIMUM ANNUAL BCF	TOTAL BCF		
CMM 61-1	J. RAY McDERMOTT & CO. INC.	MEDICINE HAT	8.3	3.0	62.0	4.9	57.1
MOG 61-1	MAYFAIR OIL & GAS (1961) LTD.						
ROC 61-1	RICHFIELD OIL CORPORATION						
ROC 65-2	RICHFIELD OIL CORPORATION	- MEDICINE HAT	0.26	0.088	2.0	0.03	1.97
HB 63-1	HUDSON'S BAY OIL AND GAS COMPANY LIMITED	- MEDICINE HAT	1.02	0.372	7.65	0.27	7.38
SPC 57-1	MANY ISLANDS PIPE LINES LTD.	- MEDICINE HAT	135.5	44.5	609.4	114.2	495.2
MO 66-1	MURPHY OIL COMPANY LTD.	- RED COULEE	0.6	-	0.5	-	0.5
NSU 64-1	THE BRITISH AMERICAN OIL COMPANY LIMITED, ROYALITE OIL COMPANY, LIMITED, SUN OIL COMPANY AND UNITED CANSO OIL & GAS LTD.	- ANTELOPE AND ESTHER	11.4	4.2	40.0	4.4	35.6
	PEACE RIVER TRNASMISSION COMPANY LIMITED	- POUCE COUPE	6.0	0.60	13.0	12.3	20.4
	PEACE RIVER TRANSMISSION COMPANY LIMITED	- POUCE COUPE SOUTH	6.9	0.98	19.7		
B 64-1	PATRICK T. BUCKLEY	- VANALTA NO. 4 WELL	1.3 MMCF PER MO.	0.010	-	0.06	-
PG 64-1	PROVO GAS PRODUCERS LIMITED	- HALLIDAY, RICHDALE AND WILDUNN CREEK	10.0	3.6	45.0	2.7	42.3

TABLE C-2 (CONTINUED)

PERMIT COMMITMENTS

(All Volumes at 14.65 psia and 60°F)

PERMIT NUMBER	PERMITTEE AND FIELDS UNDER PERMIT	PERMITTED WITHDRAWALS			WITHDRAWN TO JUNE 30, 1966	REMAINING AUTHORIZED WITHDRAWAL
		MAXIMUM DAY MMcf	MAXIMUM ANNUAL Bcf	TOTAL Bcf	Bcf	Bcf
TC 64-6	TRANS-CANADA PIPE LINES LIMITED					
	Abee, Alderson (2WS A, 2WS B and Bow Island A Pools), Atlee-Buffalo, Baptiste, Bashaw, Bellis, Bindloss, Boyle, Calling Lake, Caroline (Viking A, Viking D, Viking E and Basal Mannville A Pools), Carstairs, Cessford, Chigwell, Connorsville, Countess, Craigend, Crossfield, Crossfield East, Drumheller, Edson, Enchant, Equity, Erskine, Fenn-Big Valley, Fenn West, Figure Lake, Francis, Garrington (Viking A, Viking B, Mannville A and Leduc A Pools), Ghost Pine, Gilby, Hackett, Hamilton Lake, Harmattan East, Harmattan-Elkton (Rundle A Pool), Homeglen-Rimbey, Hussar, Innisfail, Kessler, Little Bow, Lone Pine Creek, Long Coulee, Malmo (Leduc B Pool), Marten Hills, Medicine Hat, Medicine River, Minnehik-Buck Lake, Nevis, Olds, Oyen, Pincher Creek, Prevo, Princess, Provost, Retlaw, Rich, Rowley, Sedalia, Seiu Lake, Sibbald, Standard, Stettler, Sundre (Viking A, Basal Mannville A and Basal Mannville B Pools), Sunnynook, Swalwell, Sylvan Lake, Thorhild, Three Hills Creek, Trochu, Verger, Vulcan, Wayne-Rosedale, Westerose, Westerose South, Wimborne, Wintering Hills and Wood River.	1995.0	665.0	15000.0	1894.2	13105.80

TABLE C-2 (CONTINUED)

PERMIT COMMITMENTS

(ALL VOLUMES AT 14.65 PSIA AND 60°F)

PERMIT NUMBER	PERMITTEE AND FIELDS UNDER PERMIT	PERMITTED WITHDRAWALS			WITHDRAWN TO JUNE 30, 1966	REMAINING AUTHORIZED WITHDRAWAL
		MAXIMUM DAY MMcf	MAXIMUM ANNUAL Bcf	TOTAL Bcf	Bcf	Bcf
WC 52-1	WESTCOAST TRANSMISSION COMPANY LIMITED AND WESTCOAST TRANSMISSION COMPANY (ALBERTA) LTD.					
	Braeburn, Burnt River, Gordondale, Pouce Coupe, Pouce Coupe South and Saddle Hills.	125.0	35.0	463.0	190.4	272.6
WC 59-3	WESTCOAST TRANSMISSION COMPANY LIMITED					
	Crossfield (Calgary Basal Quartz, Calgary Rundle and Calgary Wabamun Pools), Homeglen-Rimbey (Nov. 1, 1966 - March 31, 1967), Savanna Creek, Westerose (Nov. 1, 1966 - March 31, 1967) and Westerose South (Nov. 1, 1966 - March 31, 1967.	162.2	53.1	1081.2	189.1	892.1
WC 61-4	WESTCOAST TRANSMISSION COMPANY LIMITED AND WESTCOAST TRANSMISSION COMPANY (ALBERTA) LTD.					
	Boundary Lake South	Volumes Not To Exceed Those Authorized In Permit No. WC 52-1.				
WC 62-5	WESTCOAST TRANSMISSION COMPANY LIMITED AND WESTCOAST TRANSMISSION COMPANY (ALBERTA) LTD.					
	Worsley	53.3	16.0	220.0	49.5	170.5
		3379.42	1121.5565	24553.5	3351.23	21202.33

APPENDIX D

THE MEETING OF ALBERTA'S REQUIREMENTS FOR GAS AND THE PRESENT PERMIT COMMITMENTS, AND THE RESULTING SURPLUS

Views of the Applicant and Interveners

Neither Alberta and Southern nor any of the interveners at the hearing presented detailed evidence to show how Alberta's thirty-year requirements for gas might be met. However, Alberta and Southern and one of the interveners, The City of Edmonton, made recommendations and comments respecting the meeting of Alberta's requirements.

Alberta and Southern requested that, in determining the amount of contractable gas surplus to Alberta requirements, the Board view reserves with greater liberality in determining those that were contractable. It submitted that, particularly where small reserves could be economically reached from future extensions of pipe lines to larger reserves, the Board should ensure that these smaller economic reserves be included as contractable reserves.

The City of Edmonton, as described in Section IV, commented on certain matters of concern to it with respect to the provision of an adequate long term supply for its residents and the Province as a whole but did not present detailed evidence respecting Alberta's thirty-year requirements for gas and how they should be met.

1. The Meeting of Alberta's Long Term Requirements (July 1, 1966, to June 30, 1996)

As discussed in Appendix C, the thirty-year gas requirements of the markets within the Province (Alberta requirements) have been estimated at some 12.2 trillion cubic feet with a peak day requirement in the thirtieth year of some 2.7 billion cubic feet. The fields now connected to and supplying Alberta's requirements, together with their remaining reserves as of June 30, 1966, which total 6.4 trillion cubic feet, are shown in Table D-1. By coincidence thirty times the requirements of the first year of the period is also 6.4 trillion cubic feet. The contractable requirements, defined under the Board's policy set forth in OGCB Report 66-C,(1) as the greater of thirty times the requirements of the first year of the period under consideration or the remaining reserves in those fields connected to and supplying Alberta requirements, are therefore 6.4 trillion cubic feet.

Table D-1 shows also the Board's interpretation of the reserve-delivery ratio of each of the fields and the average reserve-delivery ratio of the group of fields supplying Alberta requirements. The reserve-delivery ratio is the initial gas in place adjusted for surface losses divided by the initial fully developed marketable gas deliverability.

Illustrative deliverability schedules (not reproduced here) prepared by the Board indicate that, of the total of some 6,400 billion cubic feet of gas tabulated in Table D-1, some 4,800 billion cubic feet will be produced during the thirty-year period and the remaining unproduced reserve will be capable of sustaining a peak day delivery of some 500 million cubic feet in the thirtieth year. This indicates that total deliveries of about 7,400 billion cubic feet (12,200 - 4,800 = 7,400) and a thirtieth year peak day delivery of about 2,200 million cubic feet (2,700 - 500 = 2,200) will be required from other sources.

---

(1) Report on an Application of Trans-Canada Pipe Lines Limited under The Gas Resources Preservation Act, 1956. June, 1966.

The actual quantities of gas necessary to provide these deliveries may be calculated using the formula method presented in Appendix E of OGCB Report 64-11.(2) With respect to the factors to be used in the formula, the Board believes that, since this gas must come in part from established gas reserves not now connected to local utilities nor authorized for removal from the Province and in part from gas reserves not yet developed, the factors should reflect the delivery characteristics of both of these sources of gas. In estimating this, the Board has continued its previous practice of using the average reserve-delivery ratio for all of the currently established reserves in the Province. Table D-2 presents the results of the Board's review of the average ratio and substantiates the continued use of a ratio of 2.4. The effect on the average reservoir recovery factor of changes in reserves which have occurred since the last report has been assessed, and the changes were found to be insufficient to alter the 0.84 value previously determined. The total marketable gas needed to meet Alberta's thirty-year requirements as calculated by the formula method is determined as follows, with all quantities shown being in Bcf:

---

(2) Report on the Applications of Trans-Canada Pipe Lines Limited and Alberta and Southern Gas Co. Ltd. under The Gas Resources Preservation Act, 1956. November, 1964.

From now connected sources for delivery during the period	4,800	
From additional sources for delivery during the period	7,400	
Total Alberta Requirements for Delivery		12,200
From now connected sources to protect the thirtieth year peak(1)	1,600	
From additional sources to protect thirtieth year peak(2)	4,600	
Total Alberta Requirements for Peak Day Protection		6,200
Total Alberta Requirements		18,400

(1) i.e. 6,400 - 4,800 = 1,600

(2) Determined as $R_p = 1.3\ FP_n - (1 - K)\ (1.3\ FP_n + A_1 s)$

$$= 1.3\ (2.4)\ (2{,}200) - (1 - 0.84)\left[1.3\ (2.4)\ (2{,}200) + 7{,}400\right]$$

$$= 6{,}864 - 2{,}282 = 4{,}582, \text{ say } 4{,}600$$

The provincial requirements provided for in the above analysis include pipe line fuel for the Alberta Gas Trunk Line system and the shrinkage anticipated at the Pacific Petroleums Empress and the Edmonton Liquid Gas plants due to processing for the removal of natural gas liquids. Should the removal of the additional quantities applied for by Alberta and Southern be approved, the fuel requirements would be increased somewhat but not sufficiently, having regard to the precision of the estimates, to warrant a revision of these estimates.

2. The Remaining Permit Commitments

The permit commitments remaining at June 30, 1966, are shown in Appendix C to be some 21,200 billion cubic feet.

The fields included in each of the existing permits are shown in Table D-3. The table also shows the Board's current estimate of the remaining reserves of marketable gas and the ratio of initial marketable gas in place to delivery capacity for each field. The table reflects changes in the remaining marketable reserves which have occurred since the preparation of OGCB Report 66-C and also, where major changes have occurred, it reflects a re-analysis of the reserve-delivery ratios. The table does not include figures for the Burnt Timber, Fox Creek West and Westerose Fields since the applicant stated that it had no contracts for removal of gas from these fields. In addition, the figures for the Leafland and Leafland North Fields have been combined with those for the Willesden Green Field,since the first two fields have been coalesced with the Willesden Green Field by Board order.

The remaining reserves of the Crossfield Field, in which the three major permit holders, Alberta and Southern, Trans-Canada and Westcoast, have permits, have been apportioned between them in Table D-3 on the basis of the Board's knowledge of their contracts. The entire remaining reserves which the Board attributes in Table A-1 to the Crossfield Rundle A Pool have been assigned to Alberta and Southern since, to the Board's knowledge, it is the only permit holder with contracts for gas reserves in the pool. However, the reserves attributed in Table A-1 to the Wabamun formation and the Crossfield Rundle B Pool, where both Trans-Canada and Westcoast have gas under permit, are apportioned between these permit holders in Table D-3 on the basis of the volumes of reserves under contract to the permittees.

The Board, following consideration at a public hearing of an application from Mobil Oil, recently approved the withdrawal and marketing of gas at limited rates from the Carson Creek Field. Since the operator will commence marketing limited quantities of gas from the field in the next few months, since cycling is not expected to be continued for too many years, and since the greater part of the reserves of the Carson Creek Field will be produced during the term of the Alberta and Southern permit, these gas reserves previously classified as deferred are now allocated in Table D-3 to Alberta and Southern.

The results of the Board analysis with respect to the meeting of the remaining permit commitments are shown in Table D-4. Columns 1 and 2 show respectively the remaining permit commitment and the maximum daily withdrawal authorized in each of the permits. These figures were obtained from Appendix C and have been converted to the basis of 1000 Btu per cubic foot. The expiry date of each of the permits is shown in Column 3. Columns 4 and 5 present, where applicable, the Board's current estimate of the total remaining marketable reserves and the reserve-delivery ratio (both from Table D-3) of the fields included in each permit. Column 6 shows the composite correction factor for each of the permittees' systems for which peak load protection is provided, as determined from the illustrative deliverability schedules prepared prior to the release of the Board's OGCB Report 64-11. (The Board believes that insufficient changes have occurred in the fields supplying each of the permits to warrant a detailed restudy and redetermination of the composite correction factor.) The estimated quantity of marketable gas in place required to meet the peak day commitment in the terminal year of each permit is shown where applicable in Column 7. Column 8 shows the marketable gas equivalent of Column 7. These values were obtained by deducting from Column 7 the marketable gas equivalent of the gas that will remain in the reservoirs at abandonment. The total marketable gas required to meet the permit requirements, both deliveries and peak day, is shown in Column 9. Columns 10 and 11 present the Board's estimate of the marketable gas in the fields in the permit excess to the permit commitments before and after the expiry date of each permit.

In the case of permits where the removal of all the reserves in the permit fields has been authorized or where no allowance for maximum day protection has been made by the Board, entries in Columns 5 through 8, which support the calculation of marketable reserves required to meet the terminal year peak day, have been omitted.

The reserves shown in Table D-4 as being available to meet Alberta and Southern's permit do not include reserves of the Burnt Timber, Fox Creek West and Westerose Fields, which fields are now included in the permit. The reserves of these fields are omitted because the applicant does not have contracts for gas in them.

The remaining commitment of the Westcoast Transmission Co. Ltd. Peace River permit provides for an adjustment described more fully in OGCB Report 66-C and in Permit No. WC 62-5 related to the delivery of gas from the Worsley Field and the meeting of future requirements of an iron ore processing industry in the Peace River area.

Table D-4 shows that a total marketable gas reserve of some 23.1 trillion cubic feet is required to meet the commitment of all existing permits of about 22.3 trillion cubic feet. Since reserves of almost 24.7 trillion cubic feet are available, a surplus of some 1.6 trillion cubic feet of gas exists in the fields included in the present permits. However, after the expiry dates of the permits, several years before the end of the thirty-year period, an additional 800 billion cubic feet, the amount allowed to meet the terminal year peak day deliveries for certain of the permits, will become excess to the existing permit commitments.

3. The Gas Surplus to Alberta's Requirements and the Permit Commitments

The surplus calculation, using the method adopted by the Board which has been discussed in detail in OGCB Report 66-C under the title of the Board modified method, is illustrated in Table D-5.

Table D-5 shows that the Board's estimate of contractable reserves, the reserves within economic reach (37.7 trillion cubic feet) less the deferred reserves (4.9 trillion cubic feet), totals some 32.8 trillion cubic feet. The deferred reserves are interpreted in Table D-6 as consisting of some 4.2 trillion cubic feet expected to be marketable within thirty years and 700 billion cubic feet which it appears will be deferred beyond the thirty-year period. The contractable requirements include the 6.4 trillion cubic feet now connected to supply Alberta's requirements.

and 23.1 trillion cubic feet to meet the permit commitments. A comparison of the contractable reserves and contractable requirements results in a contractable surplus of 3.3 trillion cubic feet.

The table also shows that the remaining Alberta requirements total some 12.0 trillion cubic feet. These are made up of some 7.4 trillion cubic feet which the Board believes will have to be delivered during the thirty-year period and some 4.6 trillion cubic feet which the Board estimates will be necessary to provide for the thirtieth year peak day.

The remaining and future reserves available to meet these Alberta requirements are shown to total some 9.7 trillion cubic feet. These are made up of 4.2 trillion cubic feet of deferred gas which the Board believes will be produced within the thirty-year period, some 1.8 trillion cubic feet of reserves now beyond economic reach but which the Board believes will be within economic reach within thirty years, and 3.7 trillion cubic feet of future reserves reflecting two years growth at the average growth rate over the past 24 months. Comparison of the total remaining requirements with the total remaining and future reserves indicates a future deficiency before consideration of the contractable surplus of 2.3 trillion cubic feet. The procedure by which these figures are determined is outlined in detail in OGCB Report 66-C.

The overall surplus, resulting from consideration of the contractable surplus of 3.3 trillion cubic feet and the 2.3 trillion cubic feet deficiency of remaining requirements relative to remaining and future reserves, is 1.0 trillion cubic feet. This overall surplus will increase to 1.8 trillion cubic feet after release, at the end of the term of the permits, of the 0.8 trillion cubic feet allocated to protect peak day requirements in certain permits.

The overall surplus described above is obtained after provision of 4.6 trillion cubic feet for protection of the thirtieth year peak day Alberta requirements. It will also be noted that it includes an abnormally low allocation of 3.7 trillion cubic feet as two years of trend gas, in accordance with the Board's policy of using the lesser of the actual growth over the last 24 months and the long term growth rate of 5.0 trillion cubic feet for a two-year period.

TABLE D-1

RESERVES AND RESERVE-DELIVERY RATIOS OF FIELDS NOW SUPPLYING ALBERTA'S REQUIREMENTS FOR GAS

(All Volumes At 1000 Btu Per Cubic Foot)

FIELD		MARKETABLE GAS AT JUNE 30, 1966 Bcf	RESERVE-DELIVERY(1) RATIO Bcf/MMcfd
Major Reserves			
Beaverhill Lake - Fort Saskatchewan		415	0.8
Bow Island and Foremost		42	0.9
Carbon		120	1.5
Fairydell-Bon Accord		84	0.7
Jumping Pound, Jumping Pound West and Sarcee		1198	6.6
Medicine Hat		139	3.7
Morinville and St. Albert-Big Lake		138	1.5
Okotoks		117	9.3
Paddle River		160	0.7
Turner Valley		226	6.0
Viking-Kinsella		427	1.7
Wayne-Rosedale and Redland		179	1.3
Westlock		239	1.2
Worsley		150	0.8
	TOTAL	3634	
	WEIGHTED AVERAGE		1.7
Oil Field Gas			
Acheson		17	
Bonnie Glen		270	
Campbell-Namao		16	
Fenn-Big Valley and Stettler		62	
Glen Park		10	
Judy Creek		248	

(1) The Initial Gas In Place Adjusted For Surface Losses Divided By The Initial Fully Developed Marketable Gas Deliverability.

(CONTINUED)

TABLE D-1 (CONTINUED)

FIELD		MARKETABLE GAS AT JUNE 30, 1966 BCF	RESERVE-DELIVERY RATIO BCF/MMCFD
OIL FIELD GAS (CONT'D)			
LEDUC-WOODBEND		35	
PEMBINA		890	
REDWATER		40	
SAMSON		4	
SIMONETTE		91	
STURGEON LAKE SOUTH		78	
SWAN HILLS		259	
SWAN HILLS SOUTH		161	
VIRGINIA HILLS		35	
WIZARD LAKE		117	
	TOTAL	2333	
	WEIGHTED AVERAGE		13.9
SMALL RESERVES PLUS RESERVES SUPPLYING SMALL UTILITIES			
ACHESON		25	
ALDERSON		17	
ALEXANDER		11	
ATHABASCA		7	
ATHABASCA EAST		2	
ATIM		3	
BANTRY		33	
BEAVER CROSSING		1	
BONNIE GLEN		1	
BONNYVILLE		2	
BROOKS		4	
CALAIS		8	
CASTOR		7	

(CONTINUED)

TABLE D-1 (CONTINUED)

FIELD	MARKETABLE GAS AT JUNE 30, 1966 BCF	RESERVE-DELIVERY RATIO BCF/MMCFD
SMALL RESERVES PLUS RESERVES SUPPLYING SMALL UTILITIES (CONT'D)		
CHARLOTTE LAKE	1	
COLD LAKE	2	
CRAIG LAKE	7	
DOWLING LAKE	3	
DUVERNAY	1	
EDWAND	3	
ELK POINT	1	
ELLERSLIE	1	
ETZIKOM	29	
EXCELSIOR	5	
FORT KENT	3	
GLEN PARK	5	
HAIRY HILL	14	
HAMELIN CREEK	13	
HANNA	11	
HEART RIVER	4	
HOLMBERG	21	
KNOPCIK	12	
LAC LA BICHE	4	
LEAHURST	34	
LINDBERGH	12	
LLOYDMINSTER	2	
MURIEL LAKE	6	
NORMANDVILLE	24	
OBERLIN	1	
REDWATER	9	
RYCROFT	10	
ST. PAUL	1	
STRATHMORE	10	
WATTS	2	

(CONTINUED)

TABLE D-1 (CONTINUED)

FIELD	MARKETABLE GAS AT JUNE 30, 1966 BCF	RESERVE-DELIVERY RATIO BCF/MMCFD
SMALL RESERVES PLUS RESERVES SUPPLYING SMALL UTILITIES (CONT'D)		
WHITELAW	20	
WILDMERE	18	
WILLINGDON	14	
WIZARD LAKE	1	
WOKING	4	
TOTAL	429	
WEIGHTED AVERAGE		2.5
TOTAL RESERVES CONNECTED AND SUPPLYING REQUIREMENTS	6396	
WEIGHTED AVERAGE RESERVE-DELIVERY RATIO		3.2

TABLE D-2

SUMMARY OF RESERVES AND AVERAGE RESERVE-DELIVERY RATIO FOR ALL RESERVES IN THE PROVINCE

(All Volumes At 1000 Btu Per Cubic Foot)

	MARKETABLE RESERVES AT JUNE 30, 1966 Bcf	RESERVE-DELIVERY (1) RATIO Bcf/MMcfd
Reserves Now Supplying Alberta's Requirements (See Table D-1)	6396	3.2
Fields Included In Permits (See Table D-3)	24656	2.0
Fields Applied For By Alberta And Southern Gas Co. Ltd. (See Table E-1)	728	3.5
Remaining Established Reserves(2)	8272	3.5
Total Recoverable Reserves In The Province	40052	
Weighted Average Reserve-Delivery Ratio		2.4

(1) The Initial Gas In Place Adjusted For Surface Losses Divided By The Initial Fully Developed Marketable Gas Deliverability.

(2) Includes Deferred Reserves And Reserves Now Considered Beyond Economic Reach.

TABLE D-3

MARKETABLE RESERVES AVAILABLE IN THE FIELDS INCLUDED IN PERMITS AND RESERVE-DELIVERY RATIOS

(All Volumes At 1000 Btu Per Cubic Foot)

ALBERTA AND SOUTHERN GAS CO. LTD.

FIELD	MARKETABLE RESERVES AT JUNE 30, 1966 BCF	RESERVE-DELIVERY[1] RATIO BCF/MMCFD
BERLAND RIVER	300	1.2
BIGSTONE	285	5.1
BRAZEAU RIVER	312	5.7
BURNT TIMBER(2)	-	-
CAROLINE	43	2.1
CARSON CREEK AND CARSON CREEK NORTH	418	9.2
CROSSFIELD	1016	2.5
FERRIER	17	3.0
FOX CREEK	56	1.6
FOX CREEK NORTH	52	4.5
FOX CREEK WEST(2)	-	-
HARMATTAN-ELKTON	187	1.7
HOMEGLEN-RIMBEY	152	0.8
HUNTER VALLEY	54	1.9
KAYBOB	504	2.0
MARLBORO	41	3.0
MINNEHIK-BUCK LAKE	447	3.0
PEMBINA	203	4.6
PINE NORTH-WEST	126	3.0
SUNDRE	40	10.0
SYLVAN LAKE	7	2.1
WATERTON	1172	4.0
WESTEROSE(2)	-	-

(1) The Initial Gas In Place Adjusted For Surface Losses Divided By The Initial Fully Developed Marketable Gas Deliverability.

(2) To Be Deleted From Permit As Described In Text.

TABLE D-3 (CONTINUED)

ALBERTA AND SOUTHERN GAS CO. LTD. (CONT'D)

FIELD		MARKETABLE RESERVES AT JUNE 30, 1966 BCF	RESERVE-DELIVERY RATIO BCF/MMCFD
WESTEROSE SOUTH		632	0.5
WESTWARD HO		-	-
WILDCAT HILLS		508	8.1
WILDHORSE CREEK		94	4.5
WILLESDEN GREEN(3)		125	8.0
WILSON CREEK		54	1.0
WINDFALL AND PINE CREEK		657	1.6
	TOTAL	7502	
	WEIGHTED AVERAGE		2.0

CANADIAN-MONTANA PIPELINE COMPANY

FIELD		MARKETABLE RESERVES AT JUNE 30, 1966 BCF	RESERVE-DELIVERY RATIO BCF/MMCFD
ADEN		14	
BLACK BUTTE		47	
COMREY		14	
KNAPPEN		19	
MANYBERRIES		5	
PAKOWKI LAKE		4	
PENDANT D'OREILLE		90	
SMITH COULEE		38	
	TOTAL	231	
	WEIGHTED AVERAGE		3.0

TRANS-CANADA PIPE LINES LIMITED

FIELD		MARKETABLE RESERVES AT JUNE 30, 1966 BCF	RESERVE-DELIVERY RATIO BCF/MMCFD
ABEE		8	0.7
ALDERSON		229	6.4
ATLEE-BUFFALO		132	4.1
BAPTISTE		12	3.3
BASHAW		33	1.0

(3) INCLUDES AREAS WHICH FORMERLY COMPRISED THE LEAFLAND, LEAFLAND NORTH, AND WILLESDEN GREEN FIELDS.

(CONTINUED)

TABLE D-3 (CONTINUED)

TRANS-CANADA PIPE LINES LIMITED (CONT'D)

FIELD	MARKETABLE RESERVES AT JUNE 30, 1966 BCF	RESERVE-DELIVERY RATIO BCF/MMCFD
BELLIS	41	1.3
BINDLOSS	290	3.3
BOYLE	11	0.7
CALLING LAKE	37	3.1
CAROLINE	119	2.4
CARSTAIRS	758	2.5
CESSFORD	1105	3.0
CHIGWELL	56	2.1
CONNORSVILLE	59	3.6
COUNTESS	148	2.1
CRAIGEND	179	6.3
CROSSFIELD	353	0.6
CROSSFIELD EAST	642	1.5
DRUMHELLER	49	0.6
EDSON	1804	2.2
ENCHANT	32	3.0
EQUITY	25	3.3
ERSKINE	45	-
FENN-BIG VALLEY	-	-
FENN WEST	7	2.3
FIGURE LAKE	33	1.2
FRANCIS	5	3.0
GARRINGTON	10	3.0
GHOST PINE	136	5.0
GILBY	764	2.0
HACKETT	51	3.5
HAMILTON LAKE	-	-
HARMATTAN EAST	223	8.3
HARMATTAN-ELKTON	40	1.3
HOMEGLEN-RIMBEY	518	0.8

(CONTINUED)

TABLE D-3 (CONTINUED)

TRANS-CANADA PIPE LINES LIMITED (CONT'D)

FIELD	MARKETABLE RESERVES AT JUNE 30, 1966 BCF	RESERVE-DELIVERY RATIO BCF/MMCFD
HUSSAR	512	1.8
INNISFAIL	86	12.0
KESSLER	62	2.5
LITTLE BOW	15	0.4
LONE PINE CREEK	173	7.7
LONG COULEE	14	0.2
MALMO	39	1.0
MARTEN HILLS	692	2.1
MEDICINE HAT	365	5.5
MEDICINE RIVER	263	3.4
MINNEHIK-BUCK LAKE	-	-
NEVIS	633	2.3
OLDS	245	4.2
OYEN	36	2.0
PINCHER CREEK	306	8.8
PREVO	36	4.7
PRINCESS	141	3.0
PROVOST	473	2.5
RETLAW	46	1.6
RICH	13	1.5
ROWLEY	70	1.7
SEDALIA	98	7.8
SEIU LAKE	14	3.8
SIBBALD	25	3.0
STANDARD	20	6.2
STETTLER	-	-
SUNDRE	17	1.4
SUNNYNOOK	23	1.2
SWALWELL	42	5.5
SYLVAN LAKE	516	2.0
THORHILD	10	1.7

(CONTINUED)

TABLE D-3 (CONTINUED)

TRANS-CANADA PIPE LINES LIMITED (CONT'D)

FIELD	MARKETABLE RESERVES AT JUNE 30, 1966 BCF	RESERVE-DELIVERY RATIO BCF/MMCFD
THREE HILLS CREEK	194	4.7
TROCHU	5	1.0
VERGER	69	0.7
VULCAN	35	1.8
WAYNE-ROSEDALE	206	2.5
WESTEROSE	77	10.0
WESTEROSE SOUTH	479	0.5
WIMBORNE	221	1.0
WINTERING HILLS	66	2.5
WOOD RIVER	31	2.5
TOTAL	14322	
WEIGHTED AVERAGE		1.9

WESTCOAST TRANSMISSION COMPANY LIMITED (SOUTHERN ALBERTA)

FIELD	MARKETABLE RESERVES AT JUNE 30, 1966 BCF	RESERVE-DELIVERY RATIO BCF/MMCFD
CROSSFIELD	1133	3.0
SAVANNA CREEK	388	20.0
TOTAL	1521	
WEIGHTED AVERAGE		3.7

WESTCOAST TRANSMISSION COMPANY LIMITED (PEACE RIVER)

FIELD	MARKETABLE RESERVES AT JUNE 30, 1966 BCF	RESERVE-DELIVERY RATIO BCF/MMCFD
BOUNDARY LAKE SOUTH	42	1.3
BRAEBURN	66	5.1
BURNT RIVER	3	2.0
GORDONDALE	20	3.1
POUCE COUPE	47	2.8
POUCE COUPE SOUTH	35	3.0
SADDLE HILLS	52	5.0
WORSLEY	49	0.8
TOTAL	314	
WEIGHTED AVERAGE		2.1

(CONTINUED)

TABLE D-3 (CONTINUED)

OTHERS

FIELD		MARKETABLE RESERVES AT JUNE 30, 1966 BCF	RESERVE-DELIVERY RATIO BCF/MMCFD
ANTELOPE		21	4.9
ESTHER		32	3.7
HALLIDAY		4	1.5
MEDICINE HAT		664	3.7
RED COULEE		4	-
RICHDALE		18	3.5
WILDUNN CREEK		23	2.0
	TOTAL	766	
	WEIGHTED AVERAGE		3.6
	TOTAL (ALL FIELDS)	24656	
	WEIGHTED AVERAGE (ALL FIELDS)		2.0

TABLE D-4

RESERVES REQUIRED TO MEET PRESENT PERMIT COMMITMENTS (1)

(All Volumes At 1000 Btu Per Cubic Foot)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	REMAINING PERMIT COMMITMENT									EXCESS IN PERMIT FIELDS	
PERMITTEE	TOTAL Bcf	MAXIMUM DAY MMcf	TERMINAL DATE OF PERMIT	RESERVES IN PERMIT FIELDS Bcf	RESERVE-DELIVERY RATIO OF PERMIT FIELDS Bcf/MMcfd	COMPOSITE CORRECTION FACTOR	MARKETABLE GAS IN PLACE REQUIRED TO MEET TERMINAL PEAK DAY Bcf	MARKETABLE GAS REQUIRED TO MEET TERMINAL PEAK DAY Bcf	TOTAL MARKETABLE GAS TO MEET PERMIT COMMITMENT Bcf	BEFORE TERMINAL DATE Bcf	AFTER TERMINAL DATE Bcf
Alberta And Southern Gas Co. Ltd.	6106	795	31/10/89	7502	-	-	-	-	6106	1396	1396
Canadian-Montana Pipe-line Company	231	99	14/3/86	231	-	-	-	-	231	-	-
Trans-Canada Pipe Lines Limited	13892	2115	31/10/90	14322	-	-	-	-	13892	430	430
Westcoast Transmission Company Limited (Southern Alberta)	972	177	29/2/84	1521	3.7	1.5	982	726	1698	-177	549
Westcoast Transmission Company Limited (Peace River)	314	144	31/2/79	314	-	-	-	-	314	-	-
Others	742	181		766	-	-	-	24	766	-	24
TOTALS	22257	3511		24656				750	23007	1649	2399
ROUNDED TOTALS	22300	3510		24700				800	23100	1600	2400

(1) All Figures Are As Of June 30, 1966.

TABLE D-5

GAS SURPLUS TO ALBERTA'S REQUIREMENTS AND PERMIT COMMITMENTS

AS OF JUNE 30, 1966

AS ESTIMATED BY THE BOARD

(All Volumes In Trillions Of Cubic Feet At 1000 Btu Per Cubic Foot)

CONTRACTABLE RESERVES					
Now Considered Within Economic Reach			37.7		
Less: Deferred			4.9		
Total Contractable Reserves				32.8	
CONTRACTABLE REQUIREMENTS					
Contractable Alberta Requirements			6.4		
Permit Requirements - To Meet Commitments		22.3			
- To Meet Terminal Year Peak Day		0.8			
Total Contractable Requirements				29.5	
CONTRACTABLE SURPLUS					+3.3
REMAINING REQUIREMENTS					
Total Alberta Requirements For Delivery	12.2				
Less: Deliveries From Contractable Reserves	4.8				
Deliveries Required From Other Sources		7.4			
Total Alberta Requirements For Thirtieth Year Peak Day	6.2				
Less: Available From Contractable Reserves	1.6				
Required From Other Sources To Meet Thirtieth Year Peak Day		4.6			
Total Remaining Requirements			12.0		
REMAINING AND FUTURE RESERVES					
From Deferred Gas Available Within 30 Years		4.2			
From Reserves Now Considered Beyond Economic Reach		1.8			
From 2 Years Trends		3.7			
Total Remaining and Future Reserves			9.7		
FUTURE SURPLUS					-2.3
OVERALL SURPLUS					
Before Release Of Reserves Required To Protect Peak Day In Permits					+1.0
After Release Of Reserves Required To Protect Peak Day In Permits					+1.8

TABLE D-6

DEFERRED GAS RESERVES

(All Volumes At 1000 Btu Per Cubic Foot)

POOL	MARKETABLE RESERVES AT JUNE 30, 1966 Bcf	
Marketable Within 30 Years		
Bantry Mannville A	36	
Gold Creek Wabamun A	419	
Harmattan East Rundle	980	
Harmattan-Elkton Rundle A	995	
Joarcam Viking	52	
Leduc-Woodbend D-2 A	42	
Leduc-Woodbend D-3 A	371	
Lookout Butte	416	
Pembina Cardium	200	
Windfall D-3 A	461	
Other Minor Reserves	270	
		4242
Deferred Beyond 30 Years		
Bonnie Glen D-3 A	395	
Golden Spike D-3 A	172	
Westerose D-3	106	673
Total Deferred Reserves		4915

APPENDIX E

THE APPLICANT'S APPLICATION FOR AUTHORIZATION FOR THE REMOVAL OF ADDITIONAL QUANTITIES OF GAS AND THE SURPLUS WHICH WOULD RESULT IF THE APPLICATION WERE GRANTED

Alberta and Southern is now authorized under its permit to remove from the Province 6,450 billion cubic feet of gas, of which some 690 billion cubic feet had been removed to June 30, 1966. It has applied for an increase of 1,680 billion cubic feet in the quantity authorized which would increase the total to 8,130 billion cubic feet of gas, at a maximum daily rate of 1,025 million cubic feet, from the fields now included in its permit and from eight new fields or pools. The volumes before and after adjustment to the basis of 1000 Btu per cubic foot are compared below:

	As Is Basis	1000 Btu Basis
Total Alberta and Southern permit volume, June 30, 1966, Bcf	6,450	6,840
Addition applied for, Bcf	1,680	1,778
Alberta and Southern permit volumes if the application is granted, Bcf	8,130	8,618
Removed at June 30, 1966, Bcf	690	731
Remaining Alberta and Southern permit volumes if the application is granted, Bcf.	7,440	7,887
Present maximum daily rate, MMcfd	750	795
Maximum daily rate applied for, MMcfd	1,025	1,087

All volumes subsequently referred to in this Appendix are on the basis of 1000 Btu per cubic foot.

Alberta and Southern has in effect applied for an increase of its remaining authorized withdrawals from 6,109 to 7,887 billion cubic feet (6,840 minus 731 = 6,109) as of June 30, 1966.

Table E-1 lists, with one exception, the fields for which Alberta and Southern has applied for authority to remove gas from the Province. The table also shows the Board's current estimate of the remaining reserves of marketable gas and the reserve-delivery ratio for each of these fields. The field applied for but not included in the list, is the Simonette Field, for which the applicant had, at the time of the hearing, been unsuccessful in completing contracts for gas.

The results of the Board's analysis with respect to the meeting of permit commitments and the additional volume applied for by Alberta and Southern is presented in Table E-2, which is identical in form to the previously discussed Table D-4. In fact, the only change has been to replace the Alberta and Southern entry with a new entry reflecting the additional quantities applied for and reserves available in the fields, other than the Simonette Field, from which Alberta and Southern proposes to remove gas.

It may be seen from the Alberta and Southern entry in Table E-2 that the remaining requested volume of 7,887 billion cubic feet is somewhat less than the Board's estimate of total reserves available from fields which would be included in Alberta and Southern's permit of some 8,230 billion cubic feet. Consequently, the Board is of the opinion that, if

Alberta's requirements and the other permit volumes can be separately accommodated from remaining Alberta reserves, the entire amount applied for may be included in the quantity approved for removal from the Province. However, no assurance can be given that the gas can be produced during the full term of the permit at the requested maximum daily rate.

Table E-2 further shows that with the inclusion of the volumes applied for by Alberta and Southern, the remaining permit commitments would total some 24.0 trillion cubic feet and the reserves required to meet these commitments would total some 24.8 trillion cubic feet.

Table E-3 presents the calculation of the amount of gas that will be surplus to Alberta's requirements and the permit commitments if the application of Alberta and Southern is granted. Most of the figures used in the preparation of the table have been taken directly from Table D-5.

The contractable surplus, as estimated by the Board, would be some 1.6 trillion cubic feet, as shown in Table E-3, if Alberta and Southern is authorized to remove the additional volume applied for. The table also shows that the remaining requirements would exceed the remaining and future reserves by 2.3 trillion cubic feet and that, when this deficiency is combined with the contractable surplus of 1.6 trillion cubic feet, an overall deficiency of 0.7 trillion cubic feet would result before release of reserves allocated to protect peak day requirements in permits. After release, at the end of the term of the permits, of the 0.8 trillion cubic feet of gas allocated to protect peak day requirements in permits, an overall surplus of 0.1 trillion cubic feet would exist.

As described in Appendix D, the method of calculating the surplus, in addition to providing for Alberta's contractable requirements and the requirements of the existing permits, makes allowance for the Board's estimate of remaining Alberta requirements. These remaining requirements include both the reserves estimated to be necessary for delivery during the thirty-year period and those the Board presently estimates will be needed to provide sufficient deliverability to meet the estimated thirtieth year peak in Alberta requirements. In Table E-3 the remaining requirements allocated for delivery are 7.4 trillion cubic feet and the additional reserves allocated to provide deliverability at the thirtieth year peak are 4.6 trillion cubic feet.

The Board is confident that even if the release of the 0.8 trillion cubic feet of cushion gas now allocated for certain of the permits is ignored in the calculation of the surplus position, a real deficiency would not likely materialize for the following reasons:

1. The reserves taken as two years growth of gas reserves in this assessment (3.7 trillion cubic feet) are considerably below the reserves which would result by using two years of growth at the long term growth rate. Since the reserves of gas now developed appear to be less than half of the Board's

estimate of the ultimate reserves of the Province, the lesser growth rate experienced in the past two years, as stated in Appendix B, should be considered as one low growth period in a sequence of below average and above average growth periods and the actual reserve growth is expected to continue at a rate much closer to the long term growth rate which would provide about 5.0 trillion cubic feet in two years.

2. The reserves required to meet Alberta's thirtieth year peak day requirements could be significantly reduced by the drilling of more wells, by utilizing additional compression, or by increased use of storage.

TABLE E-1

MARKETABLE RESERVES IN FIELDS APPLIED FOR BY ALBERTA AND SOUTHERN GAS CO. LTD.

(ALL VOLUMES AT 1000 BTU PER CUBIC FOOT)

FIELD		MARKETABLE RESERVES AT JUNE 30, 1966 BCF	RESERVE-DELIVERY RATIO[1] BCF/MMCFD
BELLOY		79	3.0
EAGLESHAM		66	3.5
GOLD CREEK		106	6.8
KAYBOB SOUTH		298	1.6
PEMBINA		8	1.5
TANGENT		116	8.0
WASKAHIGAN		55	1.6
	TOTAL	728	
	WEIGHTED AVERAGE		3.5

---

(1) THE INITIAL GAS IN PLACE ADJUSTED FOR SURFACE LOSSES DIVIDED BY THE INITIAL FULLY DEVELOPED MARKETABLE GAS DELIVERABILITY.

TABLE E-2

RESERVES REQUIRED TO MEET PRESENT PERMIT COMMITMENTS INCLUDING ALBERTA AND SOUTHERN APPLICATION(1)

(All Volumes At 1000 Btu Per Cubic Foot)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	REMAINING PERMIT COMMITMENT									EXCESS GAS IN PERMIT FIELDS	
PERMITTEE	TOTAL Bcf	MAXIMUM DAY MMcf	TERMINAL DATE OF PERMIT	PERMIT FIELDS Bcf	RESERVE-DELIVERY RATIO OF PERMIT FIELDS Bcf/MMcfd	COMPOSITE CORRECTION FACTOR	MARKETABLE GAS IN PLACE REQUIRED TO MEET TERMINAL PEAK DAY Bcf	MARKETABLE GAS REQUIRED TO MEET TERMINAL PEAK DAY Bcf	TOTAL MARKETABLE GAS TO MEET PERMIT COMMITMENT Bcf	BEFORE TERMINAL DATE Bcf	AFTER TERMINAL DATE Bcf
Alberta And Southern Gas Co. Ltd.	7887	1087	31/10/91	8230	-	-	-	-	7887	343	343
Canadian-Montana Pipeline Company	231	99	14/3/86	231	-	-	-	-	231	-	-
Trans-Canada Pipe Lines Limited	13892	2115	31/10/90	14322	-	-	-	-	13892	430	430
Westcoast Transmission Company Limited (Southern Alberta)	972	177	29/2/84	1521	3.7	1.5	982	726	1698	-177	549
Westcoast Transmission Company Limited (Peace River)	314	144	31/2/79	314	-	-	-	-	314	-	-
Others	742	181		766	-	-	-	24	766	-	24
TOTALS	24038	3803		25384				750	24788	596	1346
ROUNDED TOTALS	24000	3800		25400				800	24800	600	1400

---

(1) All Volumes Are As Of June 30, 1966, Except For The Adjustments For The Alberta And Southern Application.

TABLE E-3

GAS SURPLUS TO ALBERTA'S REQUIREMENTS AND PERMIT COMMITMENTS AS OF JUNE 30, 1966 IF ALBERTA AND SOUTHERN APPLICATION IS GRANTED

(ALL VOLUMES IN TRILLIONS OF CUBIC FEET AT 1000 BTU PER CUBIC FOOT)

CONTRACTABLE RESERVES					
Now Considered Within Economic Reach			37.7		
Less Deferred			4.9		
Total Contractable Reserves				32.8	
CONTRACTABLE REQUIREMENTS					
Contractable Alberta Requirements			6.4		
Permit Requirements - To Meet Commitments		24.0			
- To Meet Terminal Year Peak Day		0.8			
			24.8		
Total Contractable Requirements				31.2	
CONTRACTABLE SURPLUS					+1.6
REMAINING REQUIREMENTS					
Total Alberta Requirements For Delivery	12.2				
Less Deliveries From Contractable Reserves	4.8				
Deliveries Required From Other Sources		7.4			
Total Alberta Requirements For Thirtieth Year Peak Day	6.2				
Less: Available From Contractable Reserves	1.6				
Required From Other Sources To Meet Thirtieth Year Peak Day		4.6			
Total Remaining Requirements			12.0		
REMAINING AND FUTURE RESERVES					
From Deferred Gas Available Within 30 Years		4.2			
From Reserves Now Considered Beyond Economic Reach		1.8			
From 2 Years Trends		3.7			
Total Remaining And Future Reserves			9.7		
FUTURE SURPLUS					-2.3
OVERALL SURPLUS					
Before Release Of Reserves Required To Protect Peak Day In Permits					-0.7
After Release Of Reserves Required To Protect Peak Day In Permits					+0.1

APPENDIX F

IN THE MATTER of The Gas Resources Preservation Act, 1956, being chapter 19 of the Statutes of Alberta, 1956; and

IN THE MATTER of a Permit to Alberta and Southern Gas Co. Ltd. authorizing the removal of gas from the Province.

AMENDMENT OF PERMIT NO. AS 64-3

The Oil and Gas Conservation Board, pursuant to section 12 of The Gas Resources Preservation Act, 1956, being chapter 19 of the Statutes of Alberta, 1956, having publicly heard the application of the Permittee for amendment of the Permit, at the City of Calgary, in the Province of Alberta, at a hearing on October 4 and 5, 1966, having regard to its own knowledge and responsibility under the Act, and the Lieutenant Governor in Council having given his approval by Order in Council dated   and numbered O.C.   , hereby orders as follows:

1. Permit No. AS 64-3, dated December 1, 1964, granted under The Gas Resources Preservation Act, 1956, to Alberta and Southern Gas Co. Ltd., is amended.

2. Clause 1 of the terms and conditions of the Permit is amended by striking out the numeral "1989" and by substituting the numeral "1991".

3. Clause 2 of the terms and conditions of the Permit is struck out and the following is substituted:

2. The quantity of gas that may be removed from the Province pursuant to this Permit shall not exceed

(a) during the term of the Permit and together with gas removed under Permit No. AS 59-1 and Permit No. AS 60-2, 8,130,000,000,000 cubic feet, nor

(b) during any consecutive twenty-four hour period or any consecutive twelve-month period ending October 31, rates limited by field productivity and good engineering practice, but in a twenty-four hour period such rates shall not exceed 1,025,000,000 cubic feet and in a twelve-month period such rates shall not exceed 336,000,000,000 cubic feet.

2a. The quantity of gas that may be removed from the Province, in accordance with subclause (b) of clause 2, during any twelve-month period ending October 31, may be augmented by any part of the quantity by which gas removed from the Province under this Permit, Permit No. AS 59-1 or Permit No. AS 60-2, in the last preceding four-year period ending October 31, shall have been less than the quantity authorized by the permit or permits to be so removed in the four-year period and which has not, in the meantime, been removed from the Province as an augmentation authorized by this clause, but nothing herein authorizes the removal of gas from the Province in any consecutive twenty-four hour period or during the term of the Permit in excess of the volumes stipulated for such periods in clause 2.

4. Clause 4 of the terms and conditions of the Permit is amended as to the list of pools, fields and areas therein

(a) by striking out the following:

Burnt Timber Field

Fox Creek North Field

Fox Creek West Field

Leafland North Field

Westerose Field,

(b) by adding thereto the following:

Belloy Field

Eaglesham Field

Gold Creek Field

Kaybob South Field

Pembina Pekisko B Pool

Tangent Field

Waskahigan Field.

5. The following clause is added after clause 4 of the terms and conditions of the Permit:

4a. Not more than 100,000,000,000 cubic feet of gas from the Gold Creek Field shall be purchased or otherwise acquired for removal from the Province, or be removed from the Province under the authority of this Permit.

MADE at the City of Calgary, in the Province of Alberta, this____________day of A. D. 1967.

OIL AND GAS CONSERVATION BOARD

G. W. Govier

Chairman